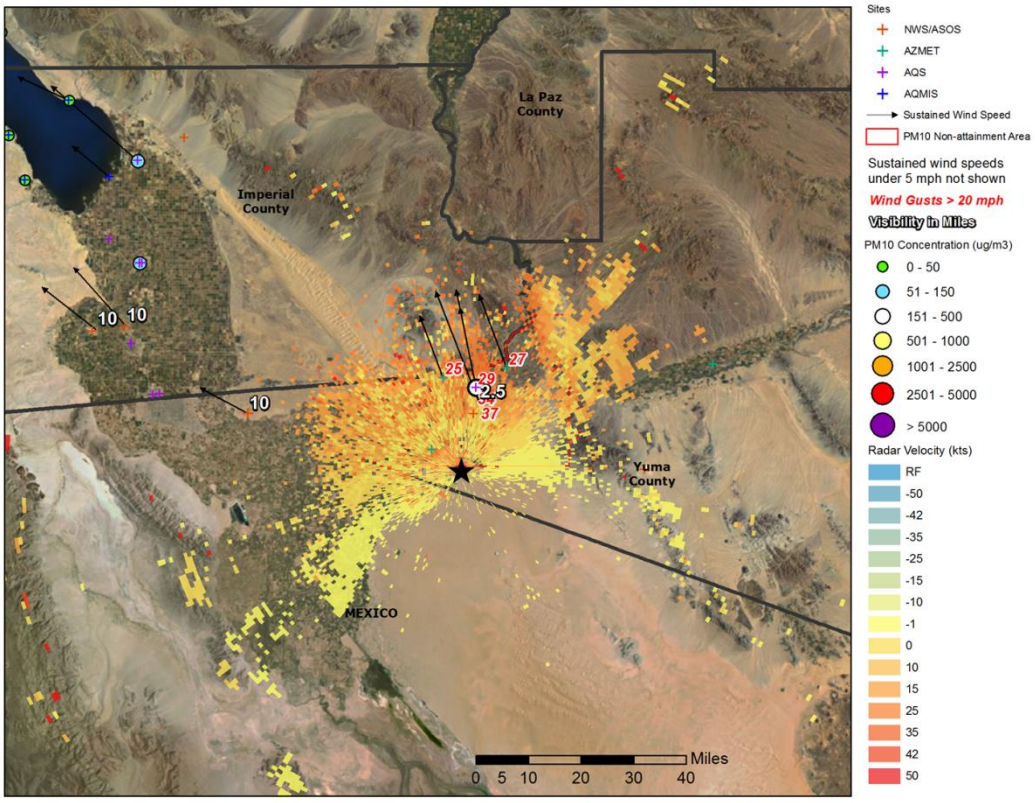
Sonoma Technology, Inc.
Air Quality Research and Innovative Solutions

State of Arizona Exceptional Event Documentation for the Event of July 4, 2013, for the Yuma County PM_{10} Nonattainment Area



Final Report Prepared for

Arizona Department of Environmental Quality
Phoenix, AZ

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State of Arizona Exceptional Event Documentation for the Event of July 4, 2013, for the Yuma County PM_{10} Nonattainment Area

Final Report
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Prepared by

Daniel Alrick
Angela Ekstrand
Hilary Hafner
Ashley Russell, PhD
Theresa O'Brien
Sonoma Technology, Inc.
1455 N. McDowell Blvd., Suite D
Petaluma, CA 94954-6503
Ph 707.665.9900 | F 707.665.9800
sonomatech.com

Prepared for

Theresa Rigney
Air Quality Assessment Section Manager
1110 W. Washington Street
Phoenix, AZ 85007
602.771.2274

November 11, 2013

Cover graphic illustrates hourly wind speeds, visibilities, radar velocities, and PM_{10} concentrations in the Yuma, Arizona, area during the July 4, 2013, windblown dust event.

Acknowledgments

The authors would like to acknowledge the Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency, Region 9, for helpful discussion and feedback during the preparation of this document.

Table of Contents

Section **Page**

List of Figures

Figure **Page**

List of Tables

1. Introduction

On July 4, 2013, the Yuma Supersite monitor recorded a 24-hr average PM_{10} concentration of 198 µg/m^3. This value is in exceedance of the National Ambient Air Quality Standard (NAAQS) of 150 µg/m^3 for 24-hr PM_{10}. This report demonstrates that this exceedance was caused by naturally occurring windblown dust, was not reasonably controllable or preventable, was historically unusual, and would not have occurred "but for" the windblown dust and, therefore, the event is an exceptional event as defined by the U.S. Environmental Protection Agency's (EPA) Exceptional Events Rule (EER).

1.1 Report Contents

Section 2 of this assessment contains a conceptual model of the thunderstorm-driven dust event that occurred on July 4, 2013, providing a background narrative of the exceptional event and an overall explanation that the event affected air quality. Section 2 also provides evidence that the event was a natural event.

Section 3 of this assessment establishes a clear causal connection between the natural event on July 4, 2013, and the exceedance of the 24-hr PM_{10} standard at the monitoring station. The evidence in this section also confirms that the event in question both affected air quality and was the result of natural events.

Section 4 of this assessment contains data summaries and time-series graphs which help illustrate that the event of July 4, 2013, produced PM_{10} concentrations in excess of normal historical fluctuations.

Section 5 of this assessment details the existing dust control measures and demonstrates that despite the presence and enforcement of these controls, the event of July 4, 2013, was not reasonably controllable or preventable.

Section 6 of this assessment builds upon the demonstration, showing a clear causal connection between the natural event and the exceedance, and concludes that the exceedance of the 24-hr PM_{10} standard on July 4, 2013, would not have occurred but for the event.

Appendix A contains time-series graphs and data tables to supplement Section 3. **Appendix B** contains air quality forecasts issued by the Arizona Department of Environmental Quality (ADEQ) and weather statements and warnings issued by the National Weather Service (NWS). **Appendix C** contains a copy of the affidavit of public notice concerning this assessment report.

1.2 Exceptional Event Rule Requirements

In addition to the technical requirements that are contained within the EER, procedural requirements must also be met for the EPA to concur with the flagged air quality monitoring data. This section of the report contains the requirements of the EER and associated guidance, and discusses how ADEQ addressed those requirements.

1.2.1 Public Notification That the Event Was Occurring (40 CFR 50.14(c)(1)(i))

ADEQ issued Air Quality Forecasts for the greater Yuma area indicating that short periods of high PM_{10} concentrations due to dust from thunderstorm outflows were possible on July 3 and July 4, 2013. More information on ADEQ's forecasting program can be found in Section 5.2 of this report. The forecast products that were issued for July 4, 2013, are included in Appendix B.

1.2.2 Place Informal Flag on Data in AQS (40 CFR 50.14(c)(2)(ii))

ADEQ and other operating air quality agencies in Arizona submit data into the EPA's Air Quality System (AQS), the official repository of ambient air quality data. This data submittal to AQS includes particulate matter (PM) data from both filter-based and continuous monitors operated in Arizona.

When ADEQ and/or another agency operating monitors in Arizona suspects that data may be influenced by an exceptional event, ADEQ and/or the other operating agency expedites analysis of the filters collected from the potentially-affected filter-based air monitoring instruments, quality-assures the results, and submits the data into AQS. ADEQ and/or other operating agencies also submit data from continuous monitors into AQS after quality assurance is complete.

If ADEQ and/or other operating air quality agencies have determined that the potential exists for a monitor's reading(s) to be influenced by an exceptional event, a preliminary flag is submitted for the measurement in AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1 following the calendar year in which the data were collected (40 CFR 58.15(a)(2)). The presence of the flag can be confirmed in AQS.

1.2.3 Notify EPA of Intent to Flag Through Submission of Initial Event Description by July 1 of Calendar Year Following Event (40 CFR 50.14(c)(2)(iii))

ADEQ submitted a letter to EPA on September 11, 2013, listing all days from calendar year 2013 that ADEQ intends to analyze under the EER. The PM_{10} exceedance that occurred at the Yuma Supersite monitor on July 4, 2013, in the Yuma PM_{10} Nonattainment Area was included on this list. This assessment report demonstrates support for the flagging of these data.

1.2.4 Document That the Public Comment Process Was Followed for Event Documentation (40 CFR 50.14(c)(3)(iv))

ADEQ posted this assessment report on the ADEQ webpage and placed a hard copy of the report in the ADEQ Records Management Center for public review. ADEQ opened a 30-day public comment period on December 16, 2013. A copy of the public notice certification, along with any comments received, will be submitted to EPA, consistent with the requirements of 40 CFR 50.14(c)(3)(iv). See Appendix C for a copy of the affidavit of public notice.

1.2.5 Submit Demonstration Supporting Exceptional Event Flag (40 CFR 50.14(a)(1-2))

At the close of the public comment period, and after ADEQ has had the opportunity to consider any comments on this document, ADEQ will submit this document, the comments received, and ADEQ's responses to those comments to EPA Region 9 headquarters in San Francisco, California. The deadline for the submittal of this package is September 30, 2016.

1.2.6 Documentation Requirements (40 CFR 50.14(c)(3)(iii))

The EER states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

1.3 Guide to New Material in This Report

Naturally occurring dust events occur several times per year in Arizona, with each event requiring the preparation of exceptional events documentation. Some text in this documentation is required by the EER and is common to all the demonstrations. The text, figures, and tables unique to this event are outlined in **Table 1-1**.

Table 1-1. Summary of information unique to the Yuma July 4, 2013, event.

Section	Unique Material
Throughout the report	Event date(s) updated
Section 2.3	Event day summary
Chapter 3	Clear causal relationship
Chapter 4	Historical norm
Sections 5.1.3 through 5.4	Source-permitted inspections and public complaints, forecasts and warnings, and wind observations
Chapters 6 and 7	But-for analysis and conclusion
Appendices A and B	Additional data, forecasts, and media reports; key points in meteorological data tables and statements are highlighted

2. Conceptual Model

This section provides a narrative background and summarizes the meteorological and air quality conditions in place on July 4, 2013, in Yuma. Elements described in this section include

- A description and map of the geographic setting of the air quality and meteorological monitors.
- A description of Yuma's climate.
- An overall description of meteorological and air quality conditions on the event day.

2.1 Geographic Setting and Monitor Locations

Yuma is located in the Sonoran Desert and Lower Colorado River Valley in extreme southwestern Arizona at an elevation of 138 feet above sea level. The Yuma Metropolitan Statistical Area is defined as Yuma County, which reported a population of 195,751 in the 2010 census. Yuma County is bordered by Imperial County, California, to the north and northwest and by the Mexican state of Baja California to the west and south (**Figure 2-1**). Yuma lies just west of the confluence of the Colorado and Gila Rivers. Most of Yuma is in the Colorado River Floodplain, commonly known as the Yuma Valley. The Yuma Valley follows the course of the Colorado River southward to the Sea of Cortez. Part of Yuma is built on the Yuma Mesa, a prominent land feature extending to the east of Yuma. The Gila Mountains, roughly 15 to 20 miles east and southeast of Yuma, have a peak elevation of 3,156 feet.

The air quality and meteorological monitors used in this analysis are shown in Figure 2-1. AQS monitors measure air quality and meteorological data; Arizona Meteorological Network (AZMET) and NWS monitors measure meteorological data only. The PM_{10} exceedance on July 4, 2013, was recorded at the Yuma Supersite monitor, which is in central Yuma and has been operational since January 1, 2010. The Yuma Courthouse monitor shown in Figure 2-1 is inactive, but measured PM_{10} prior to January 1, 2010. Data from the Yuma Courthouse monitor were used to supplement the Yuma Supersite data record for the Historical Norm section (Section 4) of this demonstration. Three AZMET sites are in operation in the Yuma area, located northeast, west, and southwest of the city. An NWS monitor is located at the Yuma Marine Corps Air Station (MCAS). Additional air quality and meteorological monitors with data relevant to this dust storm event are located in adjacent southeastern California and northwestern Mexico (**Figure 2-2**).

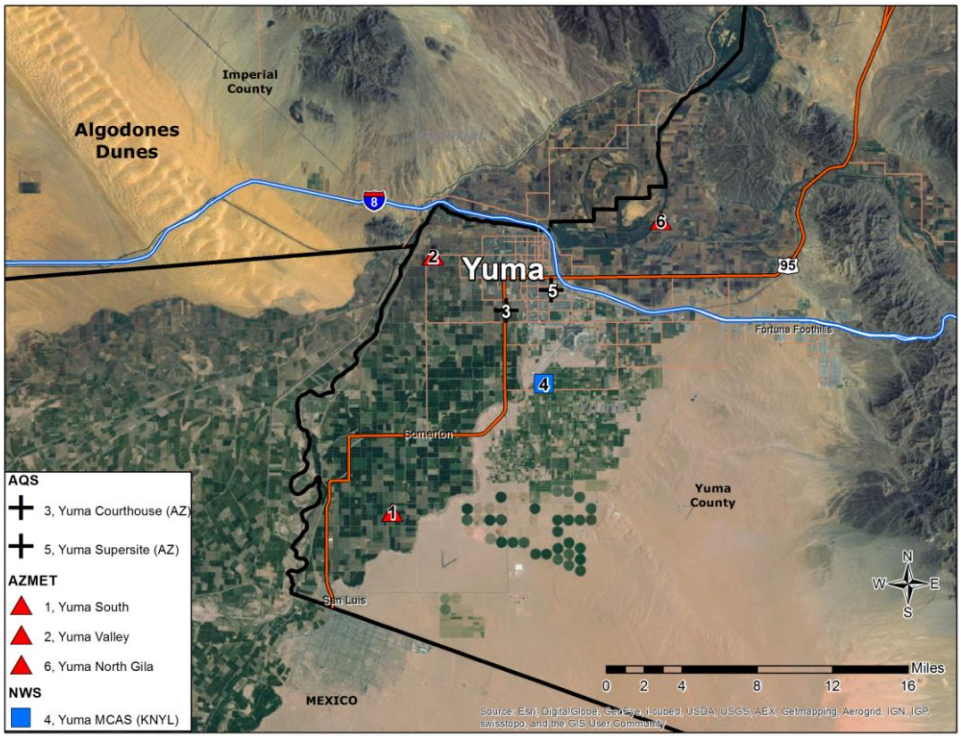


Figure 2-1. Air quality and meteorological monitors in the immediate Yuma region.

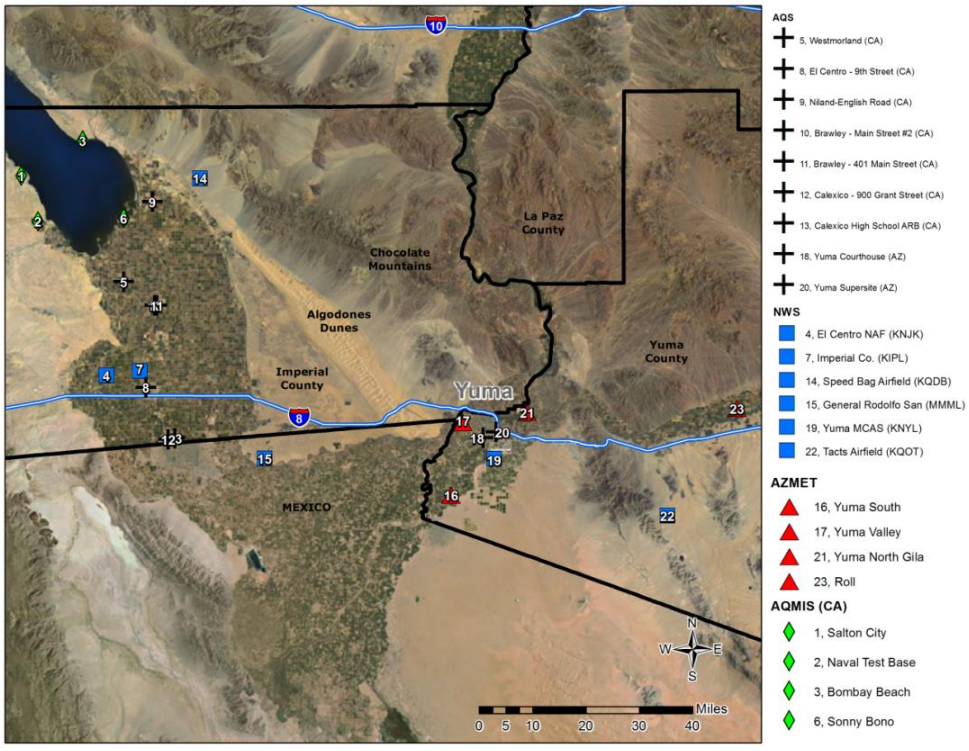


Figure 2-2. Location of air quality and meteorological monitors and relevant geographical features in the Yuma area.

2.2 Climate

Yuma is one of the hottest cities in the United States, with average high temperatures around 107°F in July and around 70°F in January (**Figure 2-3**). Yuma receives roughly 90% of possible sunshine each year. Yuma is also one of the driest cities in the United States, with an average annual rainfall of just over 3 inches. The bulk of this rain usually falls during the December-March and July-August time periods. During the December-March period, winter storms originating from the Pacific Ocean can produce significant rains in southwestern Arizona. During the July-August time period, monsoonal moisture originating from the Gulf of California, Gulf of Mexico, and large thunderstorm complexes over the Sierra Madre Occidental Mountains in Mexico move northward into Arizona.

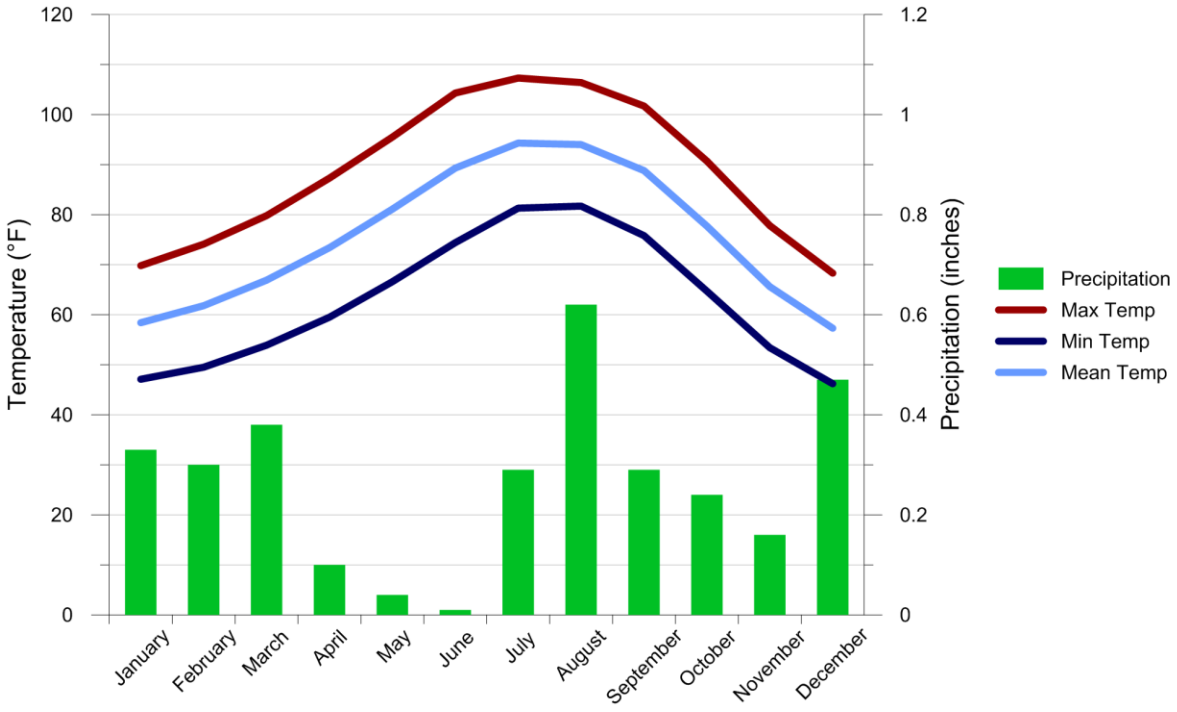
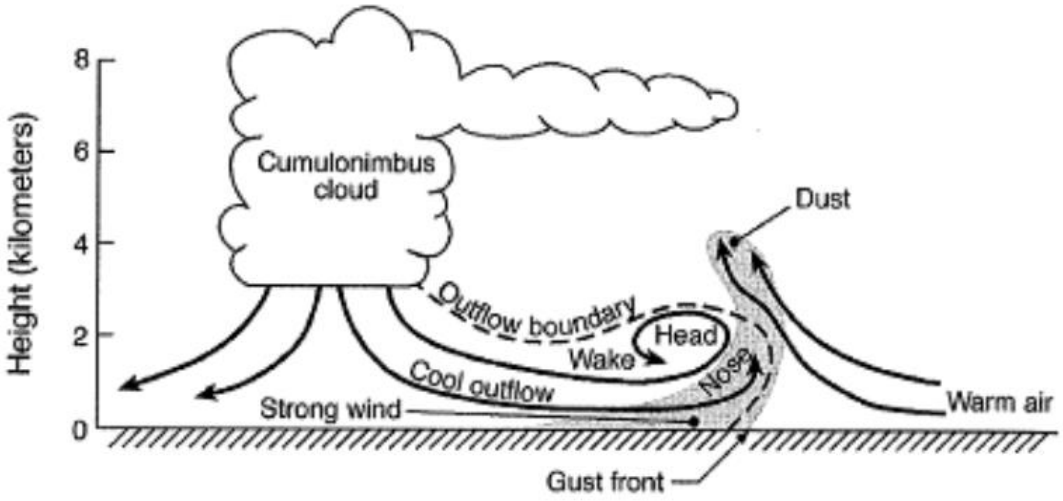


Figure 2-3. Average monthly temperatures and precipitation at Yuma MCAS, 1981–2010.

The influx of moisture associated with a monsoon, combined with strong solar heating, can result in unstable atmospheric conditions favorable for the development of thunderstorms. Heavy precipitation associated with thunderstorms, and the eventual collapse or dissipation of thunderstorms, can generate downbursts. Downbursts are rapid descents of rain-cooled air in a thunderstorm. Upon reaching the surface, this air rapidly disperses horizontally away from the storm as outflow boundaries (also called gust fronts; see **Figure 2-4**). The high winds associated with outflow boundaries can efficiently loft dust into the air and transport the dust over long distances, resulting in dust storms (also called haboobs) with high PM_{10} concentrations and low visibilities.



Cross-section schematic of a haboob caused by the cool outflow from a thunderstorm, with the leading edge that is propagating ahead of the storm called an outflow boundary. The strong, gusty winds that prevail at the boundary are defined as a gust front. The leading edge of the cool air is called the nose, and the upward-protruding part of the features is referred to as the head. Behind the roll in the windfield at the leading edge is a turbulent wake. The rapidly moving cool air and the gustiness at the gust front raise dust (shaded) high into the atmosphere.

Figure 2-4. Cross-section of a thunderstorm creating an outflow boundary and haboob.[1]

Dust storms associated with these thunderstorms typically occur in the early part of the monsoon season (July) before rains moisten the soil and limit potential lofting of soil into the air. However, depending on the amount and frequency of precipitation received during the monsoon season, extremely hot temperatures can dry the surface soils very quickly; thus, dust storms can occur at any time during the year. Specific PM_{10} source regions are difficult to determine during thunderstorm-driven dust storms because the thunderstorm outflow can carry dust over long distances that encompass many possible sources of dust. Instead, we consider general PM_{10} source regions, which are typically identified based on the locations of the thunderstorms that are believed to have generated the dust-laden outflow winds.

2.3 Event Day Summary

During the early morning hours of July 4, 2013, gusty south-southeasterly winds associated with thunderstorm outflow transported dust into Yuma (**Figure 2-5**). The windblown dust resulted in 24-hr average PM_{10} concentrations of 198 µg/m^3 at the Yuma Supersite monitor; this value is in exceedance of the NAAQS (**Table 2-1**). The hourly and 24-hr average PM_{10} concentrations measured at the Yuma Supersite monitor were in excess of normal historical fluctuations. The dust was naturally occurring and likely originated over undeveloped lands of southwestern Arizona and far northwestern Mexico outside the city of Yuma. Sustained

[1] Warner T.T. (2004) *Desert meteorology*, Cambridge University Press, Cambridge, UK. Available at http://books.google.com/books?id=kUBxA5P7YbQC.

winds of up to 30 mph with wind gusts of up to 38 mph overwhelmed reasonable dust control measures. In addition, the Yuma MCAS surface meteorological site reported blowing dust (BLDU) for several hours early on July 4, 2013, coincident with peak PM_{10} concentrations (see Appendix A).

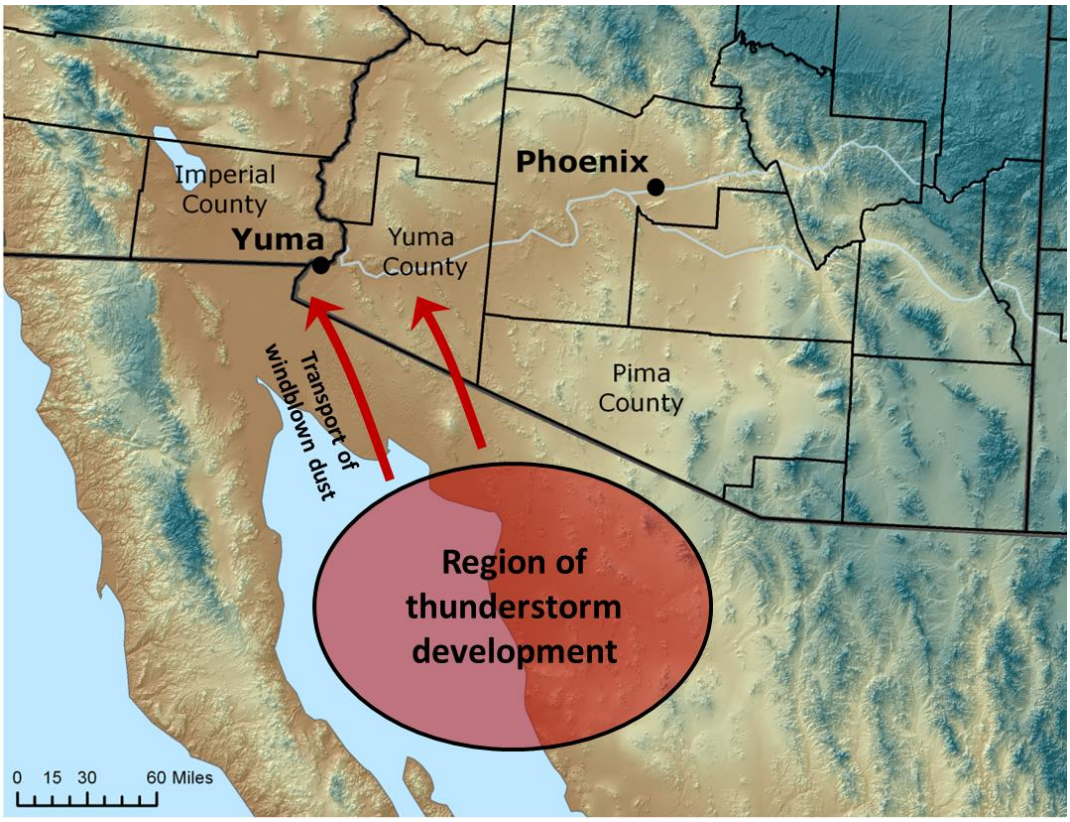


Figure 2-5. Gusty southeasterly winds generated by thunderstorms over northwestern Mexico and the Gulf of California transported dust into the Yuma area early on July 4, 2013.

Table 2-1. PM_{10} measurements collected in Arizona and southeastern California on July 4, 2013. Data from the Yuma Supersite monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
ARIZONA							
Cochise County							
Douglas Red Cross	TEOM	ADEQ	04-003-1005-81102-3	31	287	2000	
Paul Spur Chemical Line Plant	TEOM	ADEQ	04-003-0011-81102-3	32	249	2100	
Gila County							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-1	64	232	2100	
Miami Golf Course	TEOM	ADEQ	04-007-8000-81102-3	34	63	1900	
Maricopa County							
West Phoenix	TEOM	MCAQD	04-013-0019-81102-1	44	111	1300	
Mesa	TEOM	MCAQD	04-013-1003-81102-1	57	N/A	N/A	
North Phoenix	BAM	MCAQD	04-013-1004-81102-1	39	N/A	N/A	
Glendale	TEOM	MCAQD	04-013-2001-81102-1	50	N/A	N/A	
Central Phoenix	TEOM	MCAQD	04-013-3002-81102-4	51	86	2200	
South Scottsdale	GRAV	MCAQD	04-013-3003-81102-1	44	N/A	N/A	
Greenwood	TEOM	MCAQD	04-013-3010-81102-1	52	88	2300	
South Phoenix	TEOM	MCAQD	04-013-4003-81102-1	56	80	2200	
West Chandler	TEOM	MCAQD	04-013-4004-81102-1	45	80	2300	
Tempe	TEOM	MCAQD	04-013-4005-81102-1	45	N/A	N/A	
Higley	TEOM	MCAQD	04-013-4006-81102-1	48	112	2100	
West 43rd Ave	TEOM	MCAQD	04-013-4009-81102-1	55	83	1400	
Dysart	TEOM	MCAQD	04-013-4010-81102-1	48	102	2000	
Buckeye	TEOM	MCAQD	04-013-4011-81102-1	55	104	0600	
Zuni Hills	TEOM	MCAQD	04-013-4016-81102-1	45	85	2000	
Fort McDowell/ Yuma Frank	TEOM	FMIR	04-013-5100-81102-3	46	68	0200	
Durango Complex	TEOM	MCAQD	04-013-9812-81102-1	49	79	2200	
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-3	44	75	2300	
Mojave County							
Bullhead City	TEOM	ADEQ	04-015-1003-81102-1	81	193	1900	
Navajo County							
N/A	TEOM	WMAT	04-017-1002-81102-1	27	N/A	N/A	

Table 2-1. PM_{10} measurements collected in Arizona and southeastern California on July 4, 2013. Data from the Yuma Supersite monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Pima County							
Green Valley	TEOM	PCDEQ	04-019-1030-81102-1	21	43	0100	
Rillito	TEOM	ADEQ	04-019-0020-81102-3	56	165	0000	
South Tucson	TEOM	GRAV	04-019-1001-81102-1	36	N/A	N/A	
Santa Cruz County							
Nogales Post Office	TEOM	ADEQ	04-023-0004-81102-3	23	48	0000	
Yuma County							
Yuma Supersite	**TEOM**	**ADEQ**	**04-027-8011-81102-3**	**198**	**774**	**0700**	**RJ**
CALIFORNIA							
Imperial County							
Brawley-Main Street #2	GRAV	ICAPCD	06-025-0007-85101-1	76	174	0700	
Niland-English Road	BAM	ICAPCD	06-025-4004-85101-1	85	179	1000	
Santa Cruz County							
N/A	GRAV	MDAQMD	06-071-0013-81102-1	6	N/A	N/A	
N/A	GRAV	MDAQMD	06-071-0306-81102-1	21	N/A	N/A	
N Amer Chem Corp	GRAV	MDAQMD	06-071-1234-81102-1	36	N/A	N/A	
Hesperia-Olive Street	GRAV	MDAQMD	06-071-4001-81102-1	13	N/A	N/A	

BAM: Beta Attenuation Monitor
FMIR: Fort McDowell Indian Reservation
FRM: Federal Reference Method
GRAV: Gravimetric Analysis
GRIC: Gila River Indian Community
ICAPCD: Imperial County Air Pollution Control District
IJ: qualifier flag for high winds (for information only)
MCAQD: Maricopa County Air Quality Department
MDAQMD: Mojave Desert Air Quality Management District
PCAQCD: Pinal County Air Quality Control District
PCDEQ: Pima County Department of Environmental Quality
RJ: qualifier flag for high winds (for data exclusion)
SRPMIC: Salt River Pima-Maricopa Indian Community
TEOM: Tapered Element Oscillating Microbalance
WMAT: White Mountain Apache Tribe

3. Causal Relationship

3.1 Discussion

Meteorological and air quality observations indicate that dust carried by gusty winds associated with thunderstorm outflow was directly responsible for the high PM_{10} concentrations observed in Yuma early on July 4, 2013. During the evening hours of July 3, strong thunderstorms developed over the Sierra Madre Occidental along the western coast of mainland Mexico (**Figure 3-1**). These thunderstorms drifted northwestward and weakened, but gusty outflow from these winds carried dust into Yuma. The likely source region for PM_{10} during the July 4, 2013, event was the desert of southwestern Arizona and far northwestern Mexico, which largely consists of natural, undisturbed desert. The last time Yuma recorded any measurable rainfall leading up to this dust storm event was on March 8, 2013, when showers associated with a Pacific storm system produced 0.08 inches of rain at the Yuma MCAS. This combination of geography and lack of rainfall preceding the event resulted in a large fetch of soils that were particularly vulnerable to particulate suspension.

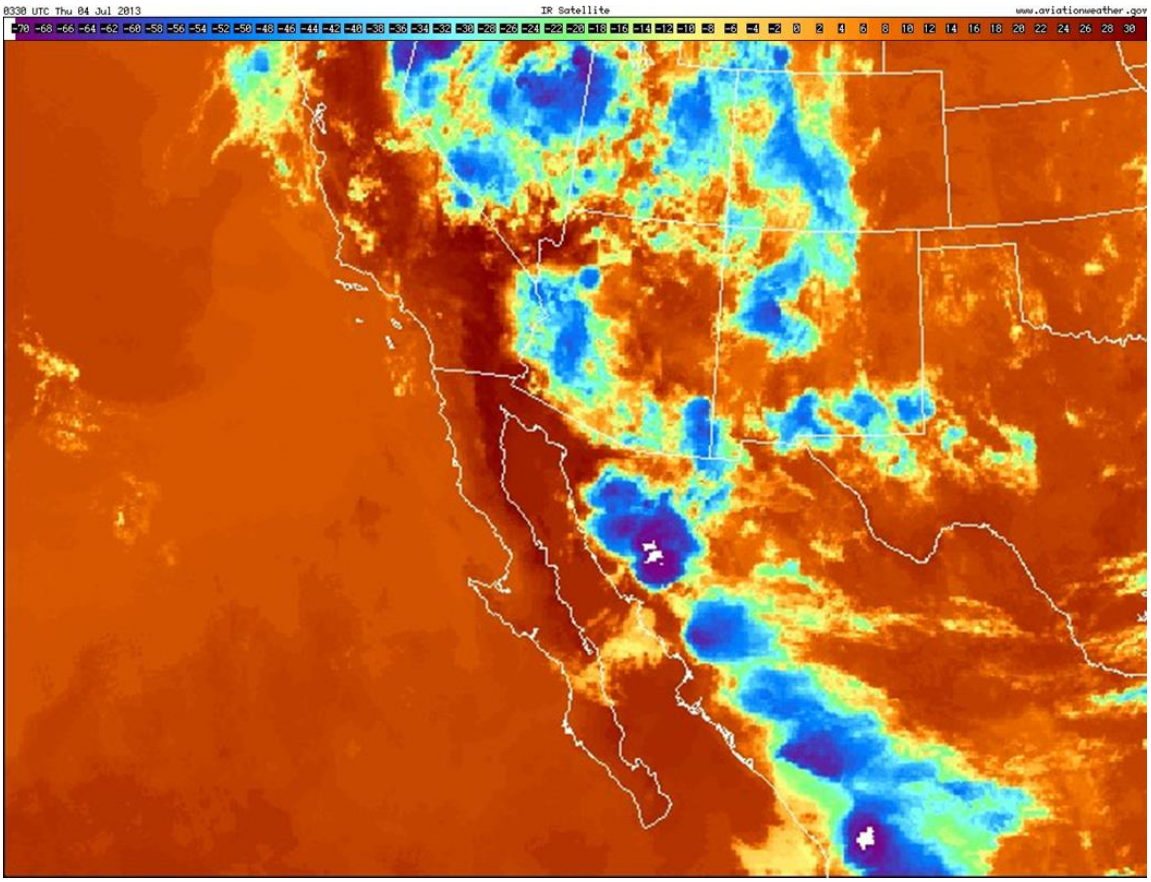


Figure 3-1. Infrared satellite image from 20:30 mountain standard time (MST) on July 3, 2013 (GOES-West). Blue, purple, and white areas indicate cold cloud tops associated with convection. Strong thunderstorms were present along the western coast of mainland Mexico.

The thunderstorms responsible for the gusty outflow and ensuing dust were clearly evident over the northern Gulf of California early on July 4, 2013, via data from the NWS Doppler radar in Yuma (**Figure 3-2**). Before the outflow and associated dust reached Yuma, winds were generally light, visibilities were high, and PM_{10} concentrations were low throughout the Yuma area (**Figure 3-3**). In contrast, as the outflow and associated dust moved through the Yuma area after 5:00 MST, southeasterly sustained winds increased to over 20 mph with gusts of up to 30 mph, visibilities fell to under 5 miles, and hourly PM_{10} concentrations exceeded 700 µg/m^3 (**Figure 3-4**). Radar velocity data also indicated strong near-surface winds in the Yuma area.

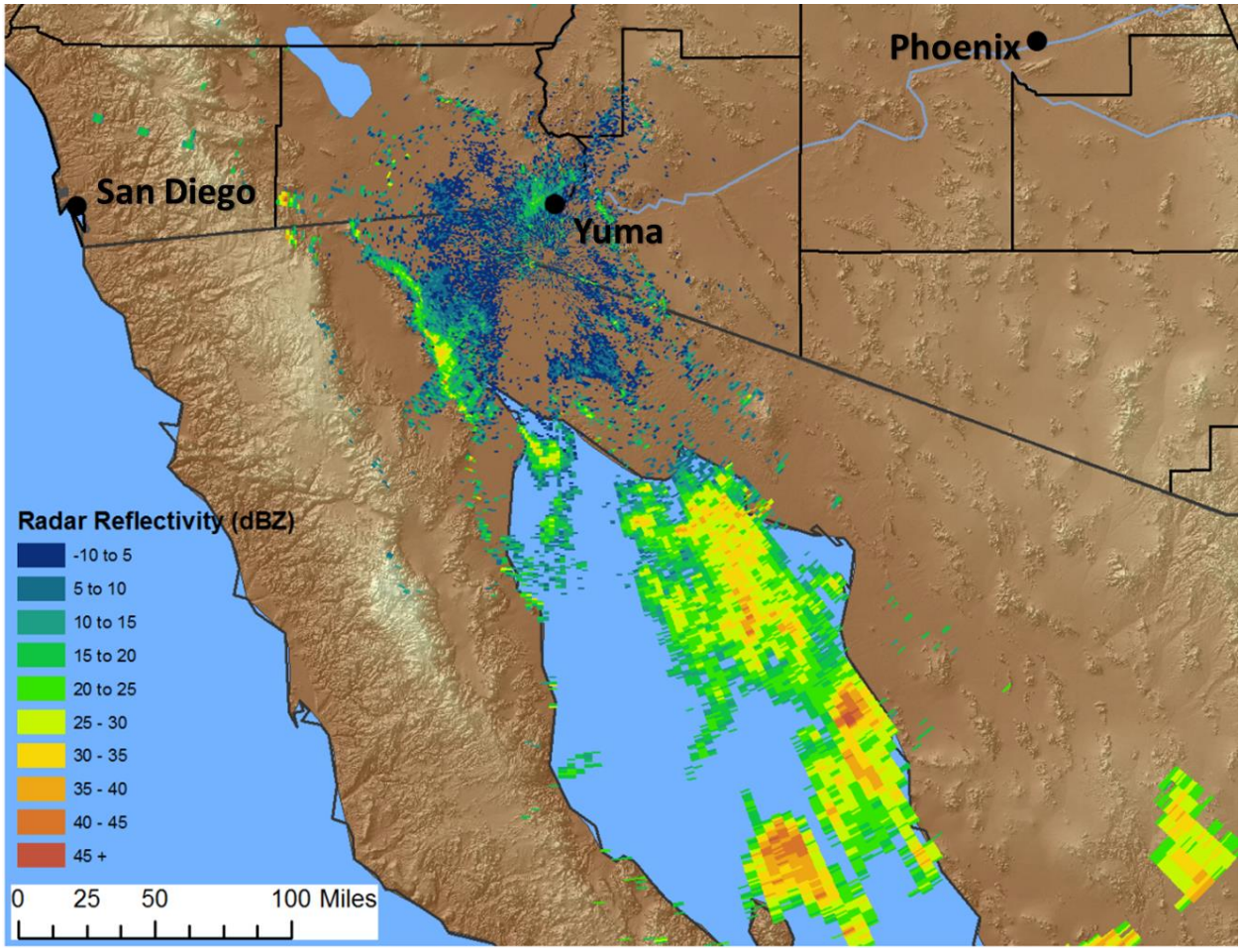


Figure 3-2. Radar reflectivity data from 02:27 MST on July 4, 2013. Warm colors indicate high radar reflectivity. Strong thunderstorms were present over the northern Gulf of California, southeast of Yuma.

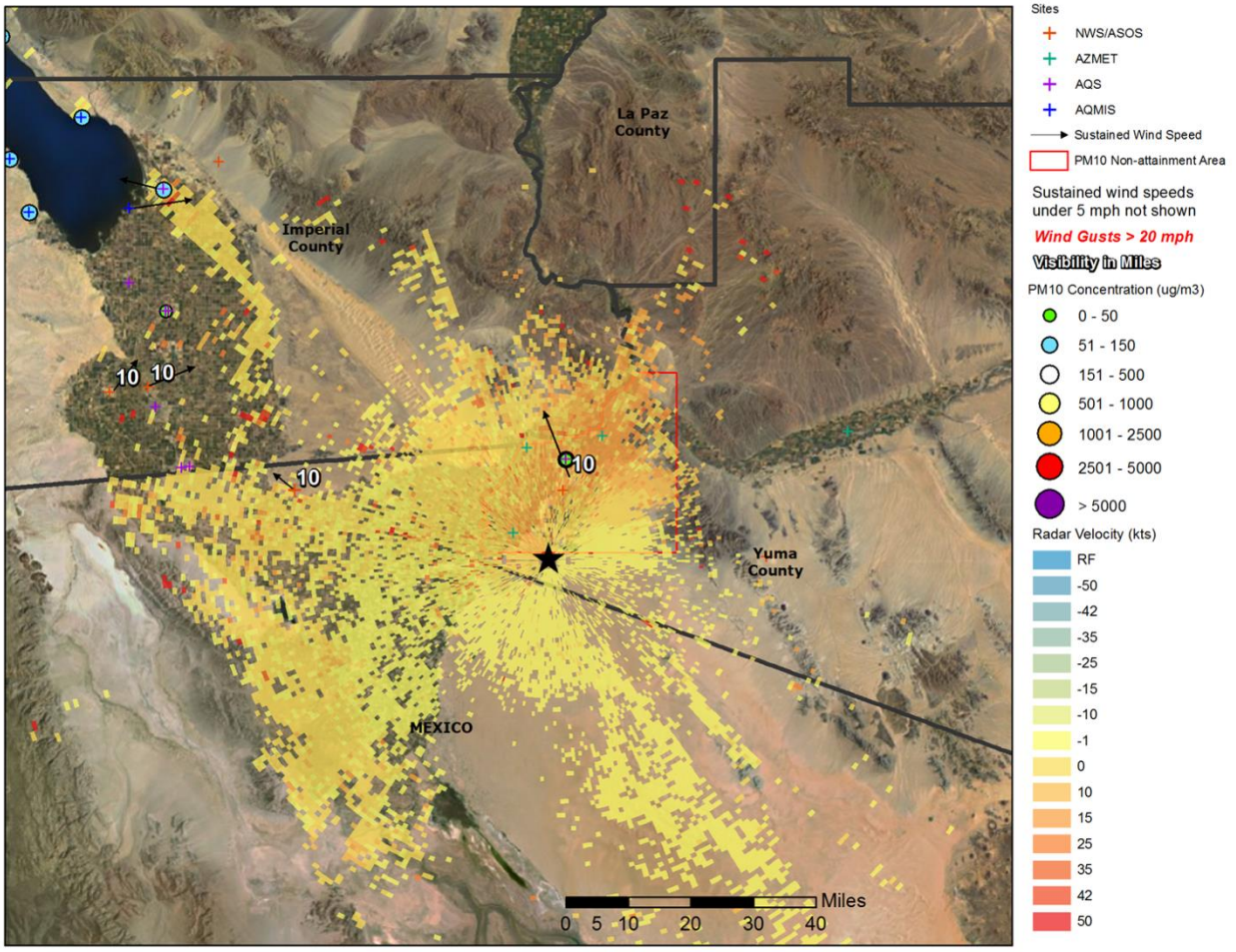


Figure 3-3. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Yuma and Imperial county monitors between 00:00 MST and 01:00 MST on July 4, 2013. Radar velocity data from the NWS Doppler radar in Yuma are also shown, where cool colors indicate motion toward the radar, and warm colors indicate motion away from the radar. The black star denotes the location of the radar.

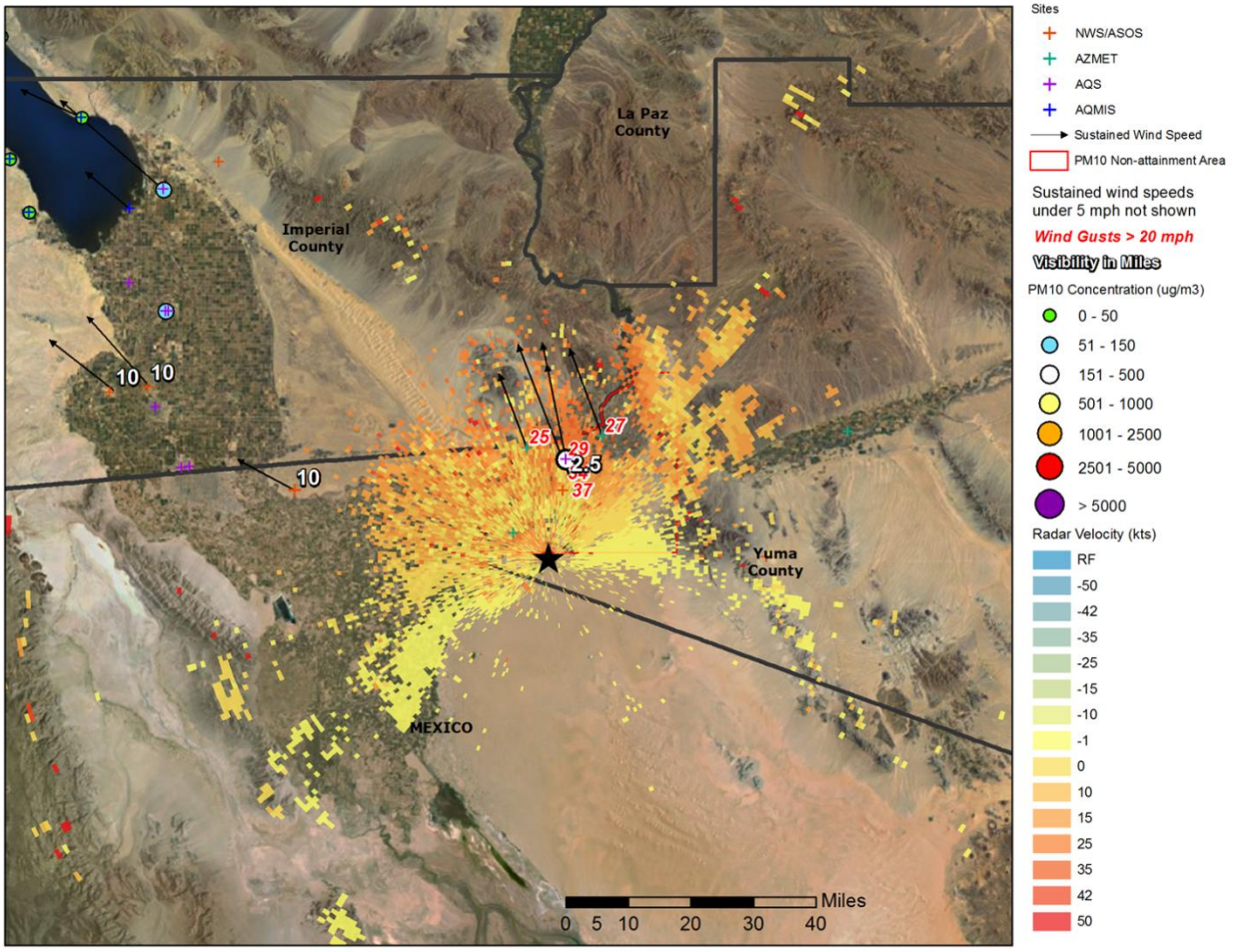


Figure 3-4. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), maximum wind gusts (red numbers), and minimum visibility (white numbers) observations at Yuma and Imperial county monitors between 07:00 MST and 08:00 MST on July 4, 2013. Radar velocity data from the NWS Doppler radar in Yuma are also shown, where cool colors indicate motion toward the radar, and warm colors indicate motion away from the radar. The black star denotes the location of the radar.

A summary of maximum sustained winds and peak wind gusts at monitors in the Yuma area is shown in **Table 3-1**, including sustained winds of up to 30 mph and a peak gust of 38 mph at the Yuma MCAS. Other monitors in the local Yuma area measured sustained winds of over 20 mph and wind gusts near 30 mph (**Figure 3-5, Figure 3-6,** and Appendix A). Visibility at the Yuma MCAS also decreased significantly with the arrival of the dust (**Figure 3-7**). Furthermore, blowing dust was reported at the Yuma MCAS. Images from ADEQ visibility cameras[2] in the Yuma area before (**Figure 3-8**) and after (**Figure 3-9**) the windblown dust arrived depict a reduction in visibility. The distinct peak in high PM_{10} concentrations at the Yuma Supersite monitor early on July 4 clearly coincides with the peak in wind speeds and minimum in visibilities, illustrating the causal relationship between the windblown dust and the

[2] Archived time-lapse video of visibility cameras in the Yuma area can be viewed online: http://www.phoenixvis.net/tlapse.aspx?site=YUMA2

observed high PM_{10} concentrations. Because this dust storm event was localized in nature and did not extend westward into California, additional time-series plots containing Imperial County data are not included in this report.

Table 3-1. Observed wind speeds and wind gusts at Yuma area monitors on July 4, 2013. The Yuma Supersite monitor reported a peak PM_{10} concentration of 774 µg/m^3 at 7:00 MST, coincident with sustained winds near 20 mph and wind gusts over 30 mph reported at that monitor.

Monitor	Maximum Wind Speed (mph)	Wind Direction (degrees)	Time (MST)	Maximum Wind Gust (mph)
Yuma Supersite	19	162	7:00	34
Yuma MCAS	30	160	7:05	38
Yuma North Gila	22	168	8:00	29
Yuma Valley	21	172	8:00	29

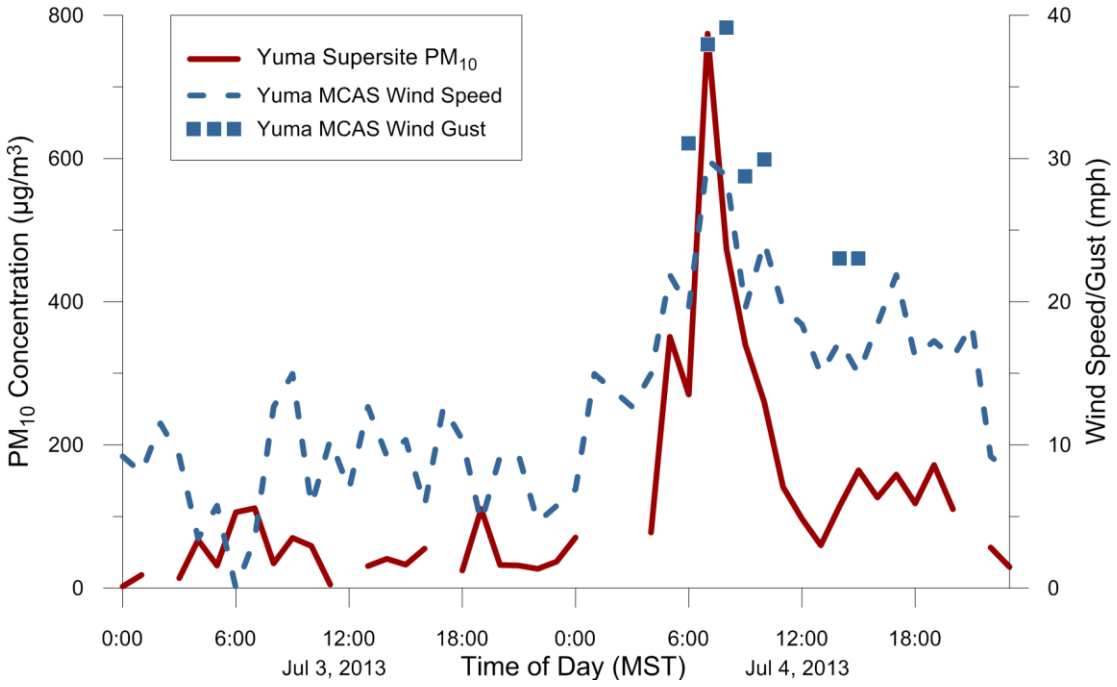


Figure 3-5. Hourly PM_{10} concentrations at the Yuma Supersite monitor and wind speeds at the Yuma MCAS monitor on July 3 and 4, 2013. PM_{10} concentrations and wind speeds sharply increased at 07:00 MST on July 4, 2013, indicating the arrival of windblown dust.

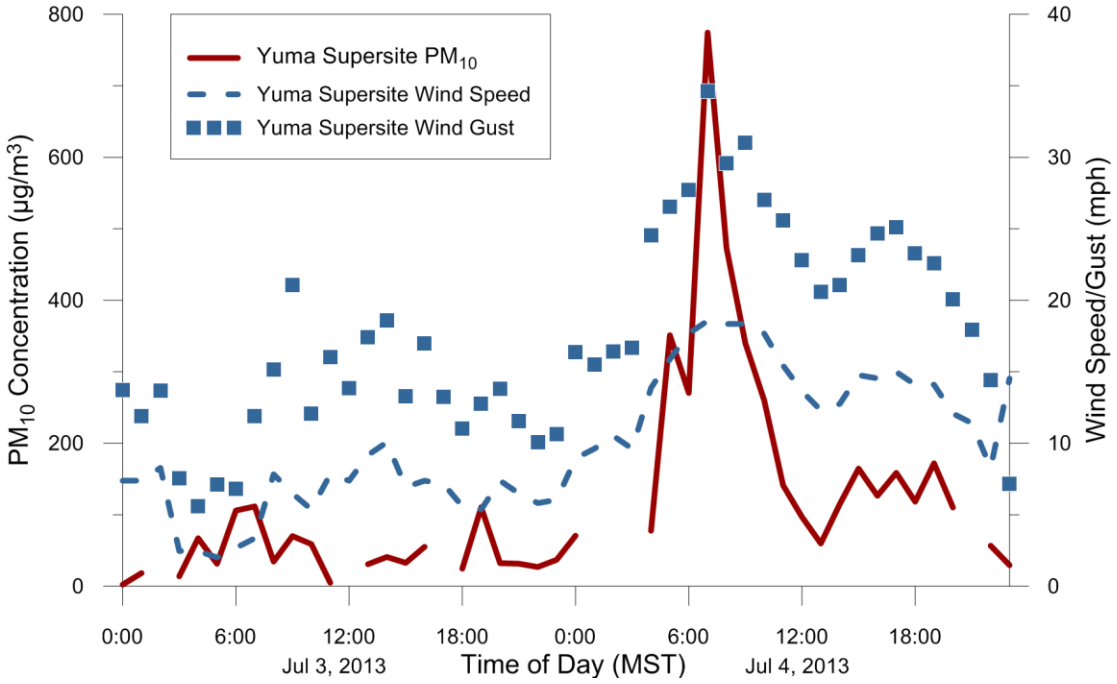


Figure 3-6. Hourly PM_{10} concentrations and wind speeds at the Yuma Supersite monitor July 3 and 4, 2013. PM_{10} concentrations and wind speeds sharply increased at 07:00 MST on July 4, 2013, indicating the arrival of windblown dust.

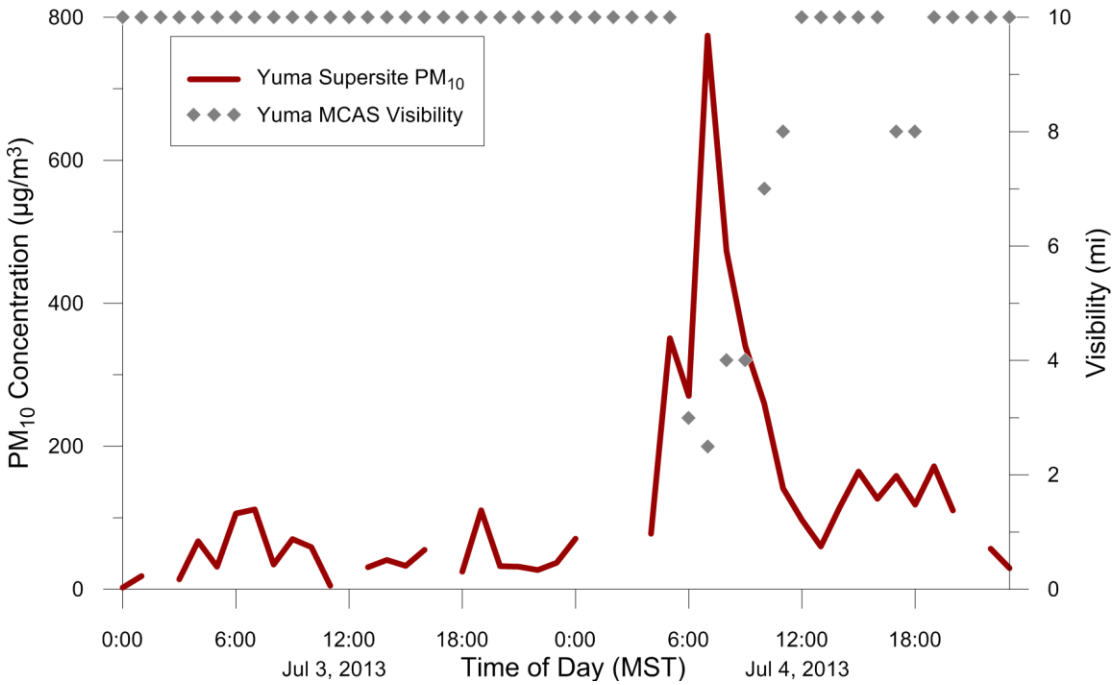


Figure 3-7. Hourly PM_{10} concentrations at the Yuma Supersite monitor and visibility at Yuma MCAS on July 3 and 4, 2013. Visibility was greatly reduced between 06:00 and 11:00 MST on July 4, coincident with the sharp increase in PM_{10} concentrations at the Yuma Supersite monitor, indicating the arrival of windblown dust.

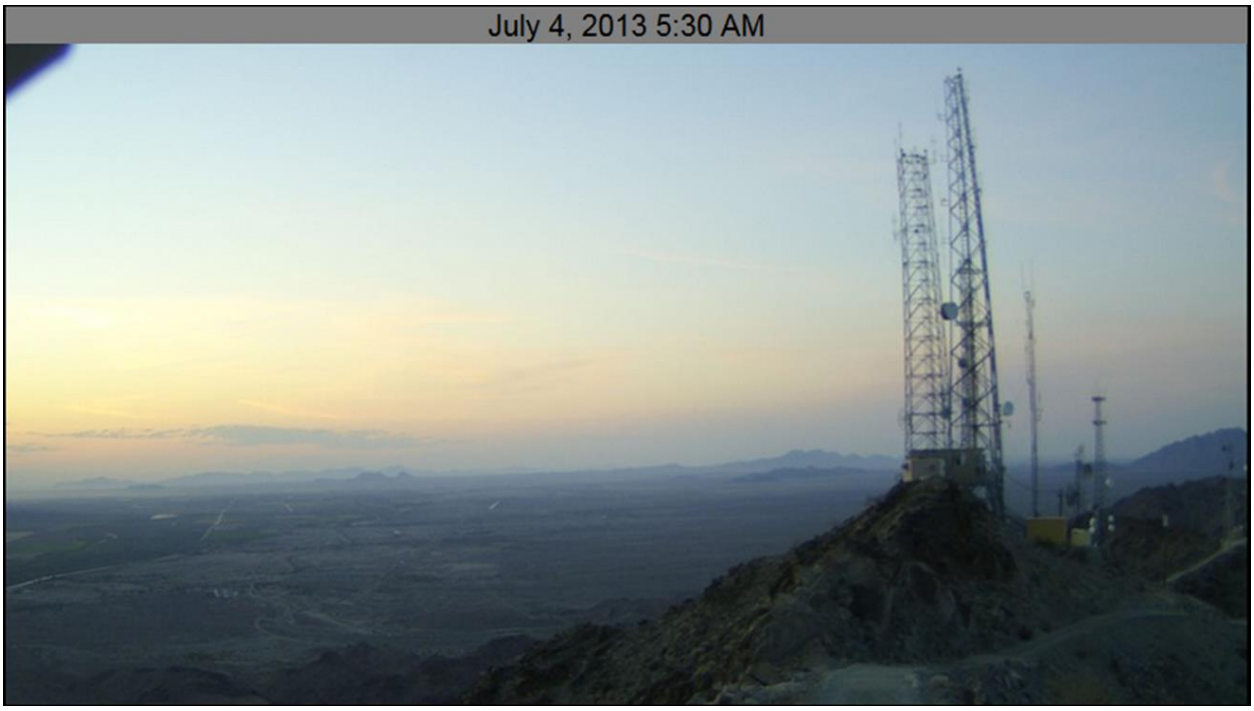


Figure 3-8. Image from ADEQ's southeastward facing visibility camera in Yuma from 05:30 MST on July 4, 2013. Blowing dust had not yet arrived in the Yuma area at this time.

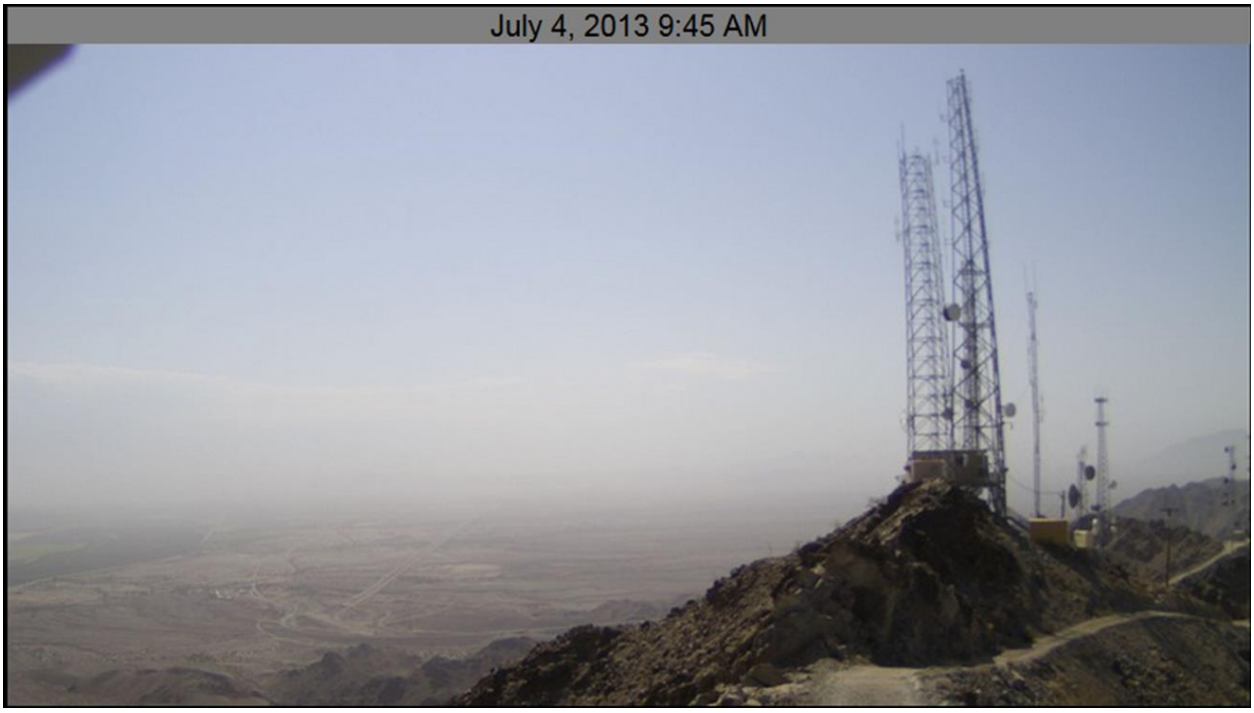


Figure 3-9. Image from ADEQ's southeastward facing visibility camera in Yuma at 09:45 MST on July 4, 2013. Blowing dust had already arrived in the Yuma area, causing reduced visibilities.

3.2 Summary

The information presented in this section demonstrates a clear causal relationship between the windblown dust and the PM_{10} exceedance measured at the Yuma Supersite monitor on July 4, 2013. The PM_{10}, wind, and visibility data shown in this section illustrate the spatial and temporal representation of the thunderstorm outflow and associated blowing dust as it moved through the Yuma area. Strong winds likely lofted large amounts of dust and PM_{10} into the lower atmosphere. This dust likely originated in open desert areas of southwestern Arizona and far northwestern Mexico. In addition, the time-series plots of air quality and meteorological data found in this section and in Appendix A show that the sharp increase in PM_{10} concentrations coincided with high wind speeds and low visibilities.

4. Historical Norm

4.1 Analysis

PM_{10} concentrations measured at the Yuma Supersite monitor on July 4, 2013, were unusual and in excess of normal historical fluctuations. The PM_{10} concentrations measured on July 4, 2013, were some of the highest hourly and 24-hr averages measured over the last five years, with hourly concentrations exceeding 700 µg/m^3. To establish the severity of this event, PM_{10} concentrations measured on July 4, 2013, were compared to a historical 2008–2013 data set (**Figure 4-1**). The 24-hr average PM_{10} concentration on July 4, 2013, is the fifteenth highest daily average during the January 2008 to July 2013 time period and the third highest daily average in January through July 2013.

A historical daily cumulative distribution of the 24-hr average PM_{10} concentrations were created for the Yuma County monitor for the January 2008 to July 2013 period to provide additional evidence establishing the severity of this event. **Figure 4-2** shows a histogram of 24-hr average PM_{10} concentrations at the Yuma County monitor and the corresponding 95th percentile. The 24-hr average PM_{10} concentration on July 4, 2013, was over twice the 95th percentile at this monitor. Concentrations in excess of the 95th percentile are considered to be unusual.[3]

4.2 Summary

Given the recorded values and using similar methodology to the one accepted by EPA, it is clear that the PM_{10} levels on July 4, 2013, were outside of normal historical fluctuations. This analysis provides evidence that the event affected air quality on a historic scale.

[3] Excluding days on which concentrations caused by exceptional events exceed the 95th percentile threshold employs a general test of statistical significance and has the effect of ensuring that such concentrations would clearly fall beyond the range of normal expectations for air quality during a particular time of year. Source: "The treatment of Data Influenced by Exceptional Events," 71 FR 12598.

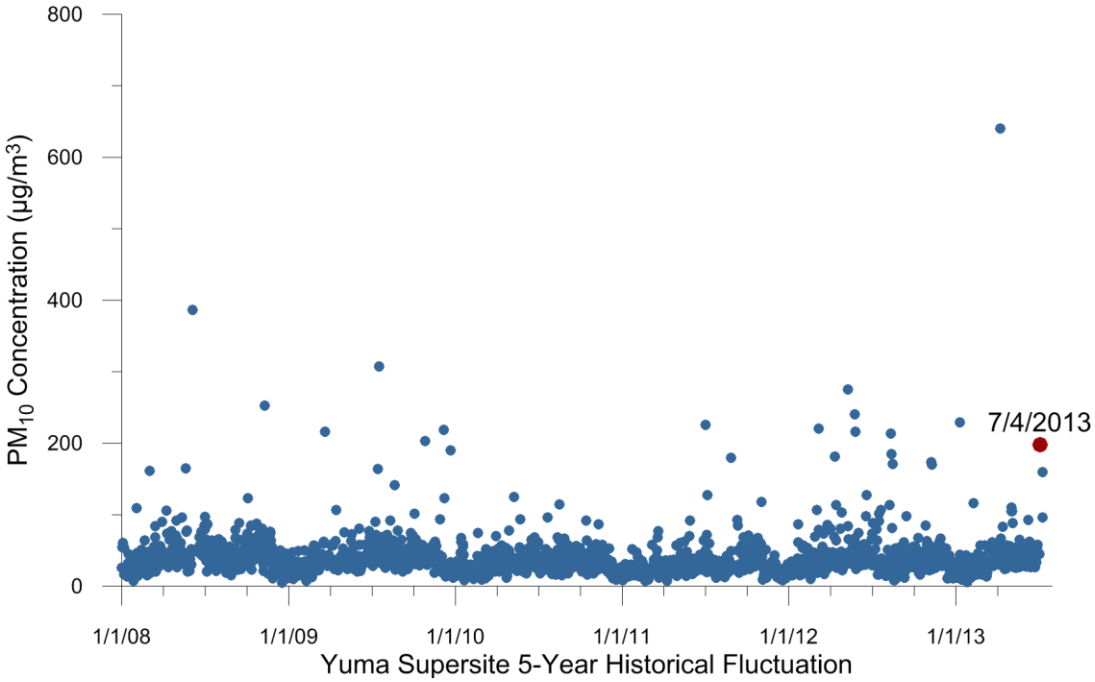


Figure 4-1. 24-hr average PM_{10} concentrations at the Yuma Supersite monitor for 2008-2013. The 24-hr average PM_{10} concentration on July 4, 2013, is highlighted in red.

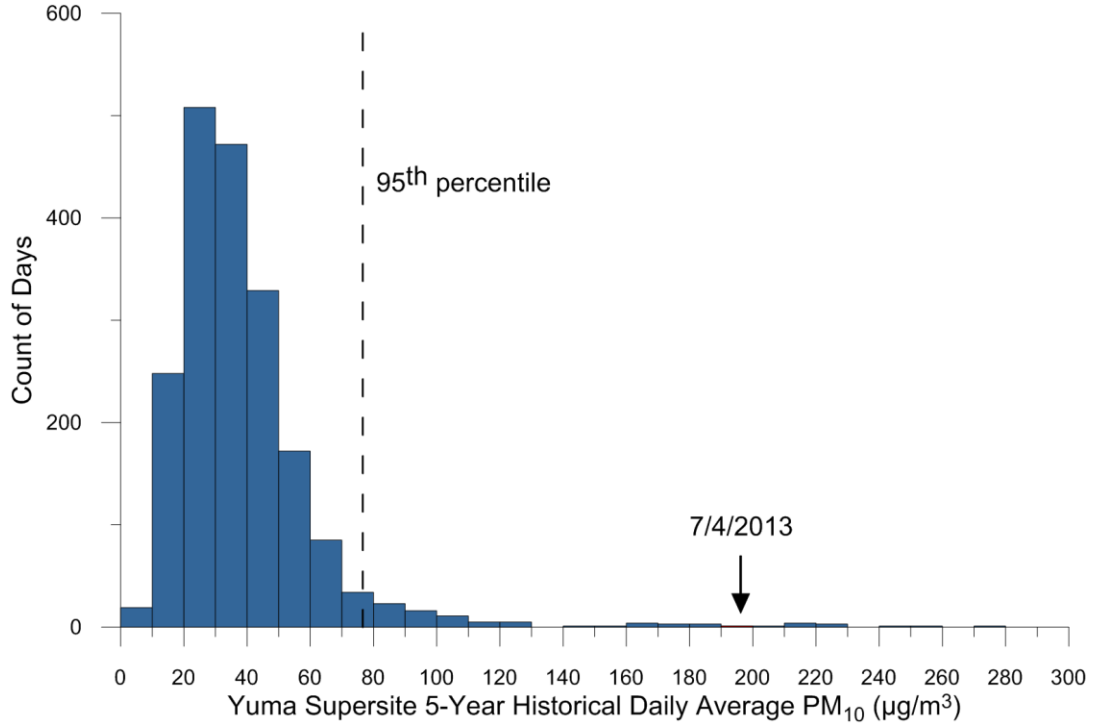


Figure 4-2. 24-hr average PM_{10} concentrations at the Yuma Supersite monitor for 2008-2013. The 24-hr average PM_{10} concentration on July 4, 2013, was over two times that of the 95th percentile.

5. Not Reasonably Controllable or Preventable

5.1 Background

Yuma was designated as a moderate PM_{10} nonattainment area by operation of the 1990 Clean Air Act. The nonattainment area is defined in 40 CFR 481.303. ADEQ completed a state implementation plan (SIP) for the area in 1991; however, the plan was found to be incomplete. In 1994, ADEQ updated the plan, identifying additional reasonably available control measures (RACM). In 2001, due to several years of "clean data" and the existence of permanent and enforceable measures, ADEQ began to develop a maintenance plan and a request for redesignation of the area to attainment. The maintenance plan was submitted to EPA in August 2006.

5.1.1 Control Measures

Details of the control measures implemented from 1994 to 2001 are in Appendix G of the 2006 Yuma PM_{10} Maintenance Plan. The control measures are listed in **Table 5-1**.

Table 5-1. Control measures implemented in the Yuma PM_{10} Nonattainment Area, 1994-2001.

Implementing Agency	Reasonably Available Control Measure
City of Yuma	Paving unpaved roads
	Closing unpaved roads
	Chemically stabilizing unpaved roads
	Paving or stabilizing parking lots
	Re-routing traffic or rapid cleanup of temporary sources of dust and spills
	Covering haul trucks
	Dust control plans for land clearing and construction projects
	Stabilizing soil, controlling dust on open lands
	Amending building codes
Town of Somerton	Re-routing traffic or rapid cleanup of temporary sources of dust and spills
	Covering haul trucks
	Dust control plans for land clearing and construction projects
	Stabilizing soil
Yuma County	Paving unpaved roads
	Stabilizing unpaved roads
	Re-routing traffic or rapid cleanup of temporary sources of dust and spills
	Covering haul trucks
	Open Burn Permit Program (rural metro)
Irrigation Districts	Reducing traffic on unpaved roads
AZ Dept. of Transportation	Requiring contractors to adhere to local dust control plans

RACM for 2000 through 2004 can be found in Table 6.3 of the 2006 Yuma PM_{10} Maintenance Plan and are reproduced in part in **Table 5-2**. Chapter 7 of the maintenance plan also contains a list of contingency measures that could be implemented promptly should any violation of the NAAQS for PM_{10} occur.

Table 5-2. Control measures implemented in the Yuma area, 2000–2004.

Implementing Agency	Reasonably Available Control Measure
City of Yuma	Pave unpaved roads
	Pave unpaved alleys
	Pave unpaved vacant land
	Chemically stabilize unpaved roads
	Water shoulders
	Street sweep paved roads
	Install curbs and sidewalks
	Landscape median
	Magnesium chloride on alleys
	Magnesium chloride on city property
Town of Somerton	Water unpaved roads
	Water unpaved shoulders
	Pave unpaved roads
	Weekly cleanup of paved roads, mud, trackout, spills
	Pave unpaved lots
	Landscape shoulders
	Install curbs
	Pave/stabilize unpaved roads
	Chip/seal
	Magnesium chloride on unpaved roads
	Street sweeping
Yuma County	Pave unpaved roads
	Developers add new paved roads
	Chip/seal unpaved roads
	Magnesium chloride unpaved roads
	Street sweeping

Table 5-2. Control measures implemented in the Yuma area, 2000–2004.

Implementing Agency	Reasonably Available Control Measure
Immigration & Naturalization	Water drag roads
	Pipelined
	Maintain 350 “No Trespassing” signs and 50 barricades
	Patrol and water unpaved canal roads
	3 miles posted/barricaded
	Paved 2.5 miles
	2.5 miles fenced off
	Abandoned 3/8 mile
	Lined 8 miles of canal
N. Gila Irrigation District	20 miles posted
Unit B Irrigation District	3 miles posted/barricaded
Bureau of Reclamation	Water 960 miles of canal banks
Marine Corps Air Station	Remove 26 gas vehicles
	Remove 25 gas scooters
	Pave 240,329-ft roadway
	Pave 102,112-ft parking
	Sweeping 717,221-yd runway
	Sweeping 388,952-yd taxiway
	Sweeping 401,090-yd aprons and 121,380-yd other
	Stabilize desert

In 2010, the Yuma Metropolitan Planning Organization (YMPO) updated the Transportation Improvement Plan (TIP) as required to comply with the requirements for transportation conformity under Section 176(c)(2) of the Clean Air Act. The update required a review of control measures included in the 2006 Yuma PM_{10} Maintenance Plan to assure that emissions were within the limits found in both plans for the current review years through the 2016 projected maintenance period. Yuma’s plans related to transportation improvements can be found under “Plans and Reports” at ympo.org.

5.1.2 Additional Measures

On August 18, 2002, Yuma recorded a 24-hr average PM_{10} concentration of 170 µg/m^3, which is in exceedance of the NAAQS. A Natural Events Action Plan (NEAP) was created to address and potentially implement any measures that could prevent future violations of the NAAQS. The option to develop a NEAP is no longer available; however, Yuma reviewed existing measures and developed additional measures that were later incorporated into the 2006 PM_{10} Maintenance Plan. These included

1. A public notification and education program, still in place today, and augmented recently by a pilot flag program for public schools and facilities based on the Yuma Dust Control Action Forecast (Appendices D, E, and F of the 2006 Yuma PM_{10} Maintenance Plan);
2. An analysis of best available control measures (BACM) normally reserved for serious nonattainment areas; and
3. A review of existing control measures for construction sources, street sweepers, paved roads, covered trucks, off-highway vehicles, stationary source opacity limits, other stationary source control measures, and agricultural best management practices (Appendix H of the 2006 Yuma PM_{10} Maintenance Plan).

In 2002, ADEQ met with Yuma stakeholders and began work on the development of a Yuma Agricultural Best Management Practices (AgBMP) rule. The rule became effective July 18, 2005, as R18-2-613 of the Arizona Administrative Code, and was submitted to EPA on August 16, 2006.

5.1.3 Review of Source-Permitted Inspections and Public Complaints

ADEQ's Arizona Unified Repository for Information Tracking of the Environment (AZURITE) database was queried to compile a list of inspections for the permitted sources in the Yuma area around the time of the July 4, 2013, PM_{10} exceedance. An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions.

5.2 Forecasts

Dust forecasts were released prior to the event by ADEQ. The ADEQ Yuma and Vicinity Dust Control Action Forecast issued on Wednesday, July 3, 2013, indicated that "short periods of high PM_{10} concentrations caused by outflow from thunderstorms" was possible on July 3 and July 4 (Appendix B).

5.3 Wind Observations

Wind data during the event were available at four Yuma-area monitors, including one AQS site, one NWS site, and two AZMET sites (Figure 3-3 and Appendix A). Sustained wind speeds of up to 30 mph with wind gusts of up to 38 mph were reported at the Yuma MCAS during the event. Peak wind gusts of 35 mph, 30 mph, and 29 mph were reported at the Yuma Supersite, Yuma North, and Yuma Valley monitors, respectively. Wind speeds of over 25 mph are normally sufficient to overcome most PM_{10} control measures.

5.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that strong winds associated with thunderstorm outflow caused uncontrollable PM_{10} emissions. The RACM outlined in the Yuma PM_{10} Maintenance Plan were in place at the time of the event. These control measures are required for areas designated as Moderate nonattainment for PM_{10},

such as Yuma County. Thus, the RACM in place at the time of the event were reasonable. In addition, surface wind measurements in the Yuma area during the event were high enough (up to 30 mph, with wind gusts of up to 38 mph) that most reasonable PM_{10} control measures would have been overwhelmed.

6. But-For Analysis

6.1 Discussion

Section 50.14(c)(3)(iv)(D) in 40 CFR Part 50 requires that an exceptional event demonstration satisfies that "[t]here would have been no exceedance or violation but for the event." The prior sections of this submittal have provided detailed information that, in regard to the PM_{10} exceedance at the Yuma Supersite monitor on July 4, 2013,

- The exceedance was not reasonably controllable or preventable, and
- There was a clear causal relationship between PM_{10} transported by strong south-southeasterly winds originating in desert areas outside the Yuma PM_{10} Nonattainment Area and the measured PM_{10} exceedance in Yuma.

The weight of evidence in these sections demonstrates that, but for the existence of dust emissions generated by gusty thunderstorm outflow and the associated transport of PM_{10}, there would have been no exceedance of the NAAQS for 24-hr average PM_{10}.

As shown in Section 3, time-series plots of PM_{10} and wind speeds establish a clear causal relationship between the arrival of dust-laden winds and elevated PM_{10} concentrations at the Yuma Supersite monitor. Multiple independent measurements of wind speed, wind direction, and visibility all point to the presence of strong south-southeasterly winds as the mechanism for transport of PM_{10} into the Yuma PM_{10} Nonattainment Area. In addition, PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event. The source regions for the PM_{10} are clearly identified as open desert areas in southwestern Arizona and far northwestern Mexico, south-southeast of the Yuma PM_{10} Nonattainment Area. The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of July 4, 2013, to any causal source except PM_{10} transported by strong south-southeasterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

As detailed in Section 5, all reasonable control measures were in place and/or implemented on a continual basis. Air quality-related inspection and compliance data revealed no violations or complaints within three days before and after the time of the event. Local regulatory agencies, industry, and the general public were alerted to the possibility of dust storms due to strong winds via daily forecasts and media reports.

6.2 Summary

The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of July 4, 2013, to any causal source except PM_{10} transported by strong south-southeasterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

7. Conclusions

The PM_{10} exceedance that occurred on July 4, 2013, satisfies the criteria of the EER, which states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
   a. the event affected air quality,
   b. the event was not reasonably controllable or preventable, and
   c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

7.1 Affects Air Quality

As stated in the preamble to the EER, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in Sections 2, 3, 4, and 5, we can reasonably conclude that the event in question affected air quality.

7.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 requires that an event must be “not reasonably controllable or preventable” in order to be defined as an exceptional event. This requirement is met by demonstrating that, despite reasonable control measures in place within Yuma County, high winds overwhelmed all reasonably available controls. The PM_{10} exceedance discussed in this report was caused by naturally occurring south-southeasterly winds that transported dust into Yuma County from areas largely outside the Yuma PM_{10} Nonattainment Area. These facts provide strong evidence that the PM_{10} exceedance on July 4, 2013, was not reasonably controllable or preventable.

7.3 Natural Event

As discussed above, the PM_{10} exceedance in Yuma on July 4, 2013, was shown to be caused by transport of PM_{10} into Yuma by south-southeasterly winds associated thunderstorm outflow. The event therefore qualifies as a natural event.

7.4 Clear Causal Relationship

The following points demonstrate that the high PM_{10} concentrations were caused by windblown dust:

- Time-series of PM_{10} concentrations show that the timing of high PM_{10} at the Yuma Supersite was consistent with gusty winds and low visibilities at Yuma-area meteorological stations (Section 3).
- PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event (Section 3).
- Dry conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by high winds (Section 3).
- The strong winds measured early on July 4, 2013, were likely associated with outflow from strong thunderstorms over northwestern Mexico (Sections 2 and 3).

7.5 Historical Norm

The 24-hr average and daily 1-hr maximum PM_{10} values measured at the Yuma Supersite monitor were historically unusual compared to a multi-year data set (Section 4).

7.6 Not Reasonably Preventable

PM_{10} control and prevention measures were in place in the Yuma PM_{10} Nonattainment Area at the time of the event. Measured wind speeds and wind gusts were of sufficient strength to overcome reasonable control measures (Section 5).

7.7 But For

On the basis of the weight of evidence described above and in Section 6, the exceedance of the federal 24-hr PM_{10} standard on July 4, 2013, at the Yuma Supersite monitor would not have occurred but for the period of strong south-southeasterly winds that transported dust from open desert areas of southwestern Arizona and far northwestern Mexico into the Yuma PM_{10} Nonattainment Area.

Appendix A:
Air Quality and Meteorological Data for Yuma County

This section contains time-series plots of air quality and meteorological data for Yuma County monitors on July 4, 2013. The data show an increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in Yuma.

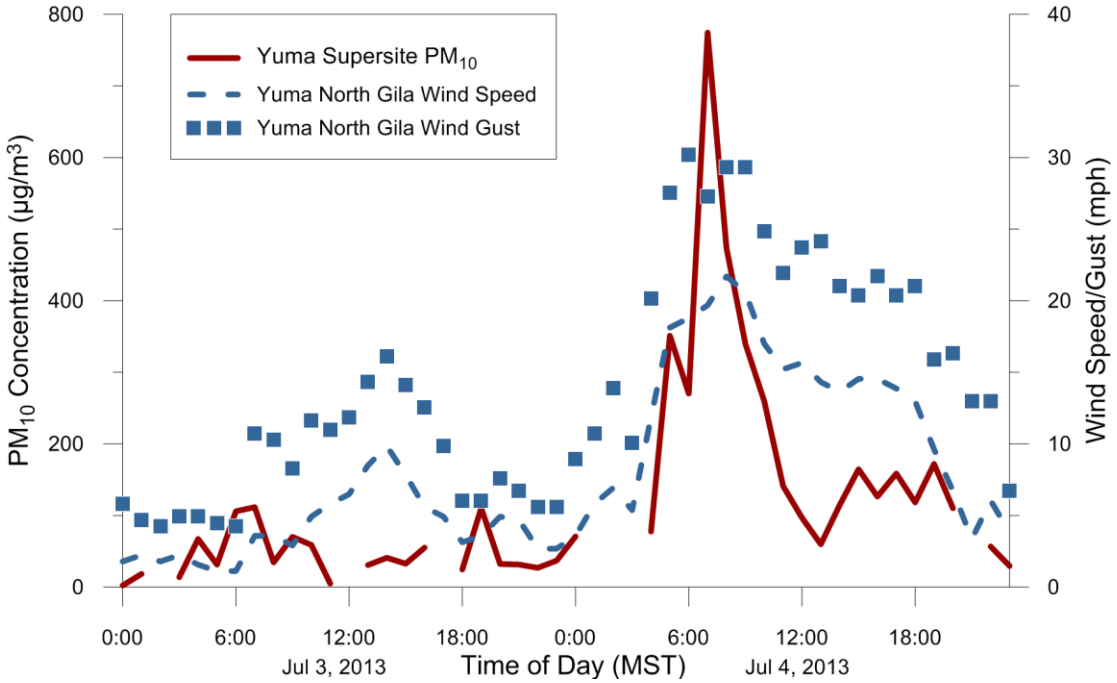


Figure A-1. Hourly PM_{10} concentrations at the Yuma Supersite monitor and wind speeds at the Yuma North Gila monitor on July 3 and 4, 2013. PM_{10} concentrations and wind speeds sharply increased at 07:00 MST on July 4, 2013, indicating the arrival of windblown dust.

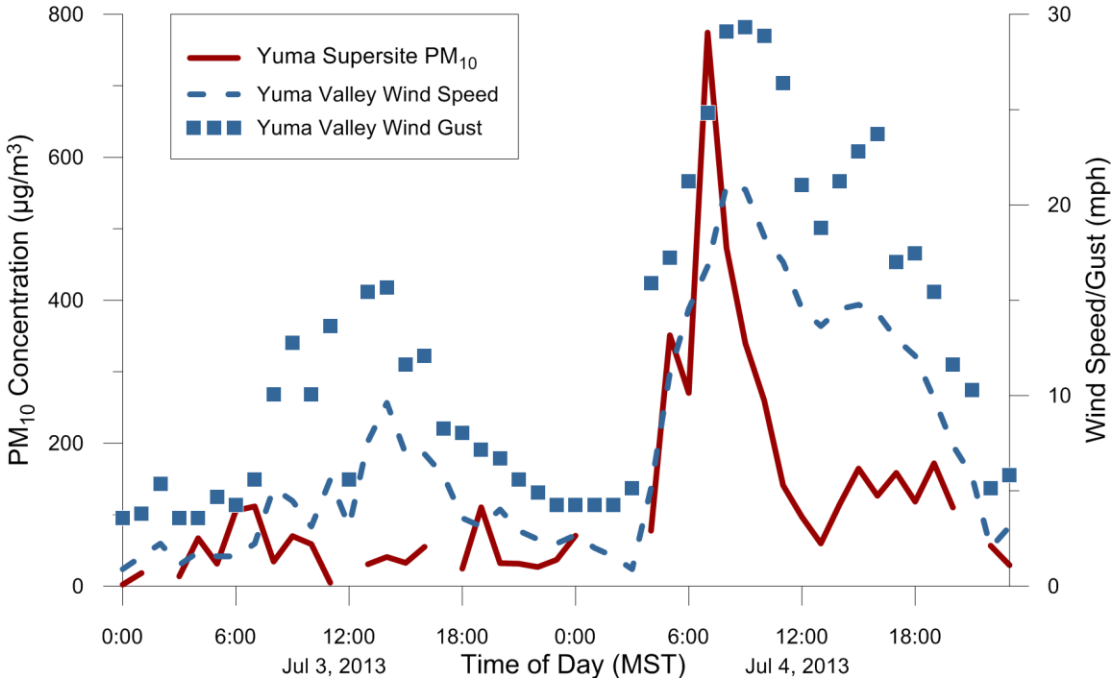


Figure A-2. Hourly PM_{10} concentrations at the Yuma Supersite monitor and wind speeds at the Yuma Valley monitor on July 3 and 4, 2013. PM_{10} concentrations and wind speeds sharply increased at 07:00 MST on July 4, 2013, indicating the arrival of windblown dust.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
YUMA MCAS (03145)
YUMA, AZ (07/03/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 213 ft. above sea level
Latitude: 32.65
Longitude: -114.616
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0057	5	BKN180 BKN250	10.00		89	31.7	69	20.7	58	14.4	35	8	170		29.51			29.72	AA		29.74
03	0157	5	BKN180 BKN250	10.00		88	31.1	69	20.5	58	14.4	36	11	170		29.49			29.71	AA		29.72
03	0257	5	BKN180 BKN250	10.00		87	30.6	68	20.0	57	13.9	36	9	160		29.47			29.69	AA		29.70
03	0357	5	SCT180 BKN250	10.00		87	30.6	67	19.5	55	12.8	34	3	270		29.47			29.69	AA		29.70
03	0457	5	SCT180 BKN250	10.00		86	30.0	68	19.9	57	13.9	37	6	040		29.50			29.71	AA		29.73
03	0557	5	SCT150 BKN250	10.00		87	30.6	69	20.3	58	14.4	37	0	000		29.50			29.72	AA		29.73
03	0657	5	SCT150 BKN250	10.00		88	31.1	68	19.9	56	13.3	34	3	070		29.51			29.73	AA		29.74
03	0757	5	SCT120 BKN150 BKN250	10.00		88	31.1	68	19.7	55	12.8	33	13	240		29.50			29.72	AA		29.73
03	0857	5	BKN120 BKN150	10.00	-RA	90	32.2	69	20.6	57	13.9	33	15	130		29.54			29.75	AA	T	29.77
03	0957	5	BKN120 BKN150	10.00		92	33.3	69	20.4	55	12.8	29	6	200		29.54			29.75	AA	T	29.77
03	1057	5	SCT120 BKN150 BKN180	10.00		94	34.4	71	21.7	59	15.0	31	10	180		29.52			29.74	AA		29.75
03	1157	5	SCT120 BKN150 BKN180	10.00		99	37.2	71	21.5	55	12.8	23	7	160		29.54			29.75	AA		29.77
03	1257	5	SCT120 BKN150 BKN180	10.00		104	40.0	69	20.4	46	7.8	14	13	200		29.50			29.72	AA		29.73
03	1357	5	SCT150 SCT180	10.00		108	42.2	70	20.8	45	7.2	12	9	180		29.47			29.69	AA		29.70
03	1457	5	FEW150 SCT180	10.00		110	43.3	71	21.7	48	8.9	13	10	230		29.44			29.66	AA		29.67
03	1557	5	FEW200	10.00		111	43.9	71	21.7	47	8.3	12	6	220		29.42			29.63	AA		29.65
03	1657	5	FEW200	10.00		111	43.9	72	22.0	49	9.4	13	13	280		29.39			29.60	AA		29.62
03	1757	5	FEW200	10.00		110	43.3	71	21.7	48	8.9	13	10	270		29.37			29.59	AA		29.60
03	1857	5	FEW200	10.00		109	42.8	70	21.1	46	7.8	12	5	250		29.37			29.59	AA		29.60
03	1957	5	SCT200	10.00		100	37.8	72	22.4	58	14.4	25	9	200		29.37			29.59	AA		29.60
03	2057	5	SCT200	10.00		96	35.6	70	21.3	56	13.3	26	9	200		29.39			29.61	AA		29.62
03	2157	5	SCT200	10.00		95	35.0	70	20.9	55	12.8	26	5	230		29.41			29.63	AA		29.64
03	2257	5	CLR	10.00		93	33.9	69	20.3	54	12.2	27	6	200		29.41			29.63	AA		29.64
03	2357	5	BKN200	10.00		90	32.2	69	20.3	56	13.3	32	7	170		29.41			29.62	AA		29.64

Figure A-3. Quality-controlled local climatological data hourly observations table for Yuma MCAS, Yuma, AZ (07/03/2013). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
YUMA MCAS (03145)
YUMA, AZ (07/04/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 213 ft. above sea level
Latitude: 32.65
Longitude: -114.616
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0057	5	BKN200	10.00		90	32.2	72	21.9	62	16.7	39	15	160		29.41			29.63	AA		29.64
04	0157	5	BKN200	10.00		88	31.1	68	20.2	57	13.9	35	14	160		29.41			29.62	AA		29.64
04	0257	5	BKN200	10.00		87	30.6	70	20.9	60	15.6	40	13	160		29.40			29.62	AA		29.63
04	0357	5	SCT200	10.00		86	30.0	70	21.3	62	16.7	45	15	170		29.40			29.62	AA		29.63
04	0457	5	SCT200	10.00		87	30.6	72	22.0	64	17.8	46	22	150		29.43			29.65	AA		29.66
04	0557	5	FEW150 SCT200	3.00	BLDU	86	30.0	73	22.5	66	18.9	51	20	150	31	29.45			29.67	AA		29.68
04	0657	5	SCT200	3.00	BLDU	89	31.7	73	22.7	65	18.3	45	26	160	32	29.47			29.68	AA		29.70
04	0705	5	SCT200	2.50	BLDU	90	32.0	73	22.5	64	18.0	42	30	160	38	29.47			M	SP		29.70
04	0731	5	SCT200	4.00	BLDU	90	32.0	74	23.2	66	19.0	45	24	170	31	29.48			M	SP		29.71
04	0757	5	SCT200	4.00	BLDU	91	32.8	73	22.7	64	17.8	41	29	170	39	29.49			29.70	AA		29.72
04	0857	5	SCT200	4.00	BLDU	94	34.4	74	23.2	64	17.8	37	20	180	29	29.49			29.71	AA		29.72
04	0957	5	SCT200	7.00	BLDU	97	36.1	74	23.0	62	16.7	31	24	180	30	29.48			29.70	AA		29.71
04	1057	5	SCT250	8.00		100	37.8	74	23.2	61	16.1	28	20	180		29.48			29.69	AA		29.71
04	1157	5	SCT250	10.00		103	39.4	74	23.4	60	15.6	24	18	180		29.47			29.68	AA		29.70
04	1257	5	SCT250	10.00		106	41.1	74	23.3	58	14.4	21	15	170		29.45			29.67	AA		29.68
04	1357	5	BKN250	10.00		107	41.7	73	23.0	56	13.3	19	17	190	23	29.43			29.65	AA		29.66
04	1457	5	SCT250	10.00		107	41.7	74	23.4	58	14.4	20	15	170	23	29.41			29.63	AA		29.64
04	1557	5	SCT250	10.00		106	41.1	75	24.0	61	16.1	23	18	170		29.39			29.61	AA		29.62
04	1657	5	SCT250	8.00		104	40.0	74	23.5	60	15.6	24	22	160		29.37			29.59	AA		29.60
04	1757	5	SCT250	8.00		102	38.9	74	23.2	60	15.6	25	16	170		29.36			29.58	AA		29.59
04	1857	5	SCT250	10.00		98	36.7	71	21.6	56	13.3	25	17	170		29.37			29.59	AA		29.60
04	1957	5	FEW250	10.00		95	35.0	71	21.6	58	14.4	29	16	170		29.38			29.59	AA		29.61
04	2057	5	FEW250	10.00		92	33.3	72	22.3	62	16.7	37	18	160		29.40			29.62	AA		29.63
04	2157	5	FEW250	10.00		90	32.2	73	22.5	64	17.8	42	9	180		29.43			29.64	AA		29.66
04	2257	5	FEW250	10.00		88	31.1	73	22.8	66	18.9	48	8	180		29.44			29.65	AA		29.67
04	2357	5	FEW250	10.00		87	30.6	73	22.7	66	18.9	50	10	170		29.44			29.65	AA		29.67

Figure A-4. Quality-controlled local climatological data hourly observations table for the Yuma MCAS, Yuma, AZ (07/04/2013). Note that blowing dust (BLDU) was reported for several hours, coincident with reduced visibilities and gusty southeasterly winds. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
IMPERIAL COUNTY AIRPORT (03144)
IMPERIAL, CA (07/03/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: -58 ft. below sea level
Latitude: 32.834
Longitude: -115.578
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0053	12	CLR	10.00		87	30.6	65	18.3	50	10.0	28	6	270		29.76			29.70	AA		29.70
03	0153	12	CLR	10.00		84	28.9	65	18.5	53	11.7	34	0	000		29.75			29.69	AA		29.69
03	0253	12	CLR	10.00		84	28.9	66	18.7	54	12.2	36	0	000		29.74			29.68	AA		29.68
03	0353	12	CLR	10.00		84	28.9	68	20.1	59	15.0	43	5	240		29.75			29.69	AA		29.69
03	0453	12	CLR	10.00		84	28.9	68	20.1	59	15.0	43	5	100		29.76			29.71	AA		29.70
03	0553	12	CLR	10.00		86	30.0	66	19.1	54	12.2	33	8	250		29.76			29.70	AA		29.70
03	0653	12	CLR	10.00		92	33.3	68	19.9	53	11.7	27	5	200		29.78			29.72	AA		29.72
03	0753	12	CLR	10.00		93	33.9	71	21.6	59	15.0	32	0	000		29.77			29.71	AA		29.71
03	0853	12	CLR	10.00		94	34.4	77	24.7	69	20.6	44	9	080		29.78			29.72	AA		29.72
03	0953	12	CLR	10.00		95	35.0	75	23.6	65	18.3	37	11	130		29.78			29.72	AA		29.72
03	1053	12	CLR	10.00		101	38.3	73	22.9	59	15.0	25	11	130		29.78			29.72	AA		29.72
03	1153	12	CLR	10.00		105	40.6	73	22.5	55	12.8	19	8	130		29.76			29.70	AA		29.70
03	1253	12	CLR	10.00		105	40.6	75	24.0	61	16.1	24	11	140		29.74			29.68	AA		29.68
03	1353	12	CLR	10.00		107	41.7	75	24.0	60	15.6	22	10	200		29.69			29.63	AA		29.63
03	1453	12	CLR	10.00		108	42.2	75	23.6	58	14.4	19	5	180		29.67			29.61	AA		29.61
03	1553	12	FEW110	10.00		112	44.4	73	22.6	51	10.6	13	3	VR		29.63			29.57	AA		29.57
03	1653	12	BKN110	10.00		111	43.9	73	22.7	52	11.1	14	10	230		29.61			29.56	AA		29.55
03	1753	12	BKN110	10.00		105	40.6	73	22.5	55	12.8	19	13	230		29.62			29.56	AA		29.56
03	1853	12	CLR	10.00		100	37.8	70	21.0	52	11.1	20	14	250		29.63			29.57	AA		29.57
03	1953	12	CLR	10.00		95	35.0	68	19.9	51	10.6	22	11	250		29.63			29.57	AA		29.57
03	2053	12	CLR	10.00		93	33.9	67	19.6	51	10.6	24	11	250		29.66			29.60	AA		29.60
03	2153	12	CLR	7.00		91	32.8	66	19.0	50	10.0	25	8	270		29.67			29.61	AA		29.61
03	2253	12	CLR	10.00		91	32.8	66	19.0	50	10.0	25	7	230		29.67			29.62	AA		29.61
03	2353	12	CLR	10.00		90	32.2	65	18.4	48	8.9	24	10	250		29.66			29.60	AA		29.60

Figure A-5. Quality-controlled local climatological data hourly observations table for the Imperial County Airport, Imperial, CA (07/03/2013). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
IMPERIAL COUNTY AIRPORT (03144)
IMPERIAL, CA (07/04/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: -58 ft. below sea level
Latitude: 32.834
Longitude: -115.578
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0053	12	CLR	10.00		87	30.6	65	18.0	49	9.4	27	3	220		29.66			29.60	AA		29.60
04	0153	12	CLR	10.00		87	30.6	64	17.8	48	8.9	26	5	120		29.65			29.59	AA		29.59
04	0253	12	CLR	10.00		83	28.3	75	24.1	72	22.2s	70	6	130		29.65			29.59	AA		29.59
04	0353	12	CLR	10.00		82	27.8	75	23.9	72	22.2	72	6	120		29.67			29.61	AA		29.61
04	0453	12	CLR	10.00		82	27.8	76	24.3	73	22.8	74	16	140		29.69			29.63	AA		29.63
04	0553	12	CLR	10.00		84	28.9	76	24.6	73	22.8	70	15	150		29.71			29.65	AA		29.65
04	0653	12	CLR	10.00		88	31.1	79	25.9	75	23.9	65	20	140		29.73			29.67	AA		29.67
04	0753	12	CLR	10.00		91	32.8	79	26.3	75	23.9	60	17	150		29.74			29.68	AA		29.68
04	0853	12	CLR	10.00		94	34.4	81	27.1	76	24.4	56	14	130		29.73			29.67	AA		29.67
04	0953	12	CLR	10.00		99	37.2	80	26.4	72	22.2	42	11	130		29.73			29.67	AA		29.67
04	1053	12	CLR	10.00		101	38.3	76	24.5	65	18.3	31	7	140		29.72			29.66	AA		29.66
04	1153	12	CLR	10.00		105	40.6	77	25.0	65	18.3	27	9	110		29.70			29.65	AA		29.64
04	1253	12	CLR	10.00		106	41.1	74	23.1	57	13.9	20	5	110		29.68			29.62	AA		29.62
04	1353	12	CLR	10.00		107	41.7	76	24.5	62	16.7	23	9	160		29.66			29.60	AA		29.60
04	1453	12	FEW100	10.00		109	42.8	76	24.2	60	15.6	20	10	120		29.63			29.57	AA		29.57
04	1553	12	FEW100	10.00		109	42.8	74	23.0	55	12.8	17	13	130		29.61			29.55	AA		29.55
04	1653	12	FEW110	10.00		105	40.6	77	24.7	64	17.8	26	18	140		29.59			29.54	AA		29.54
04	1753	12	CLR	10.00		101	38.3	77	24.8	66	18.9	32	16	130		29.61			29.55	AA		29.55
04	1853	12	CLR	10.00		97	36.1	77	25.1	69	20.6	40	15	140		29.62			29.57	AA		29.56
04	1953	12	CLR	10.00		93	33.9	75	23.9	67	19.4	43	14	150		29.64			29.58	AA		29.58
04	2053	12	CLR	10.00		92	33.3	74	23.5	66	18.9	42	14	140		29.67			29.61	AA		29.61
04	2153	12	CLR	10.00		88	31.1	77	24.8	72	22.2	59	14	140		29.68			29.62	AA		29.62
04	2253	12	CLR	10.00		87	30.6	77	25.0	73	22.8	63	8	140		29.68			29.62	AA		29.62
04	2353	12	CLR	10.00		84	28.9	77	24.9	74	23.3	72	9	120		29.68			29.62	AA		29.62

Figure A-6. Quality-controlled local climatological data hourly observations table for the Imperial County Airport, Imperial, CA (07/04/2013). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
NAF (23199)
EL CENTRO, CA
(07/03/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: -42 ft. below sea level
Latitude: 32.816
Longitude: -115.683
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0056	5	M	10.00		88	31.1	64	17.6	46	7.8	23	3	240		29.75			29.75	AA		29.71
03	0156	5	M	10.00		84	28.9	65	18.5	53	11.7	34	5	180		29.73			29.73	AA		29.69
03	0256	5	M	10.00		83	28.3	66	18.8	55	12.8	38	3	190		29.72			29.72	AA		29.68
03	0356	5	M	10.00		84	28.9	64	18.0	51	10.6	32	3	240		29.73			29.73	AA		29.69
03	0456	5	M	10.00		88	31.1	64	17.8	47	8.3	24	5	300		29.74			29.75	AA		29.70
03	0556	5	BKN150 BKN200	10.00		89	31.7	65	18.4	49	9.4	25	8	260		29.75			29.75	AA		29.71
03	0656	5	BKN150 BKN200	10.00		96	35.6	67	19.5	48	8.9	19	5	220		29.77			29.78	AA		29.73
03	0756	5	BKN150	10.00		96	35.6	68	19.7	49	9.4	20	5	190		29.76			29.76	AA		29.72
03	0856	5	BKN150	10.00		98	36.7	72	22.1	58	14.4	26	9	060		29.76			29.77	AA		29.72
03	0956	5	FEW080 BKN120 BKN150	10.00		94	34.4	76	24.4	68	20.0	43	9	110		29.76			29.76	AA		29.72
03	1056	5	FEW080 BKN120 BKN150	10.00		100	37.8	75	24.1	64	17.8	31	10	130		29.76			29.76	AA		29.72
03	1156	5	FEW080 BKN120 BKN150	10.00		104	40.0	75	24.1	62	16.7	25	10	110		29.74			29.75	AA		29.70
03	1256	5	FEW080 BKN120	10.00		108	42.2	72	22.3	52	11.1	16	9	110		29.73			29.73	AA		29.69
03	1356	5	FEW080 BKN120	10.00		108	42.2	73	22.9	55	12.8	17	11	160		29.67			29.68	AA		29.63
03	1403	5	FEW080 BKN120	10.00		109	43.0	74	23.5	57	14.0	18	13	170		29.67			M	SP		29.63
03	1456	5	FEW080 BKN120	10.00		110	43.3	74	23.2	55	12.8	16	3	VR		29.64			29.65	AA		29.60
03	1556	5	FEW120	10.00		113	45.0	71	21.5	44	6.7	10	9	220		29.61			29.62	AA		29.57
03	1656	5	FEW120	10.00		110	43.3	72	22.3	51	10.6	14	15	230		29.59			29.60	AA		29.55
03	1756	5	CLR	8.00		108	42.2	71	21.6	49	9.4	14	20	250		29.61			29.61	AA		29.57
03	1856	5	CLR	10.00		103	39.4	69	20.6	48	8.9	16	16	240		29.62			29.62	AA		29.58
03	1956	5	CLR	10.00		100	37.8	68	19.9	47	8.3	17	14	250		29.62			29.63	AA		29.58
03	2056	5	M	9.00		96	35.6	67	19.2	47	8.3	19	10	250		29.65			29.65	AA		29.61
03	2156	5	M	9.00		94	34.4	66	18.9	47	8.3	20	11	250		29.65			29.66	AA		29.61
03	2256	5	M	10.00		92	33.3	65	18.5	47	8.3	21	8	250		29.65			29.66	AA		29.61
03	2356	5	M	10.00		91	32.8	65	18.1	46	7.8	21	8	220		29.65			29.65	AA		29.61

Figure A-7. Quality-controlled local climatological data hourly observations table for the Naval Air Facility (NAF), El Centro, CA (07/03/2013). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
NAF (23199)
EL CENTRO, CA (07/04/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: -42 ft. below sea level
Latitude: 32.816
Longitude: -115.683
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0056	5	M	10.00		90	32.2	63	17.3	43	6.1	19	10	240		29.64			29.65	AA		29.60
04	0156	5	M	10.00		85	29.4	63	17.0	46	7.8	26	7	160		29.63			29.63	AA		29.59
04	0256	5	M	10.00		81	27.2	66	18.7	56	13.3	42	5	130		29.63			29.63	AA		29.59
04	0356	5	M	9.00		79	26.1	70	21.0	65	18.3	62	5	120		29.65			29.65	AA		29.61
04	0456	5	M	9.00		80	26.7	74	23.2	71	21.7	74	14	130		29.67			29.67	AA		29.63
04	0556	5	M	10.00		84	28.9	77	24.9	74	23.3	72	13	140		29.69			29.69	AA		29.65
04	0656	5	M	10.00		88	31.1	78	25.5	74	23.3	63	17	130		29.71			29.71	AA		29.67
04	0756	5	M	10.00		91	32.8	79	26.0	74	23.3	58	15	140	23	29.72			29.72	AA		29.68
04	0856	5	M	10.00		94	34.4	80	26.7	75	23.9	54	10	140		29.71			29.72	AA		29.67
04	0956	5	M	10.00		97	36.1	80	26.4	73	22.8	46	8	120		29.71			29.71	AA		29.67
04	1056	5	M	10.00		102	38.9	77	24.9	66	18.9	31	7	100		29.70			29.70	AA		29.66
04	1156	5	M	10.00		105	40.6	76	24.2	62	16.7	25	9	090		29.68			29.69	AA		29.64
04	1256	5	M	10.00		106	41.1	75	23.6	59	15.0	21	9	090		29.66			29.66	AA		29.62
04	1356	5	M	10.00		108	42.2	75	24.1	60	15.6	21	9	130		29.64			29.64	AA		29.60
04	1456	5	M	10.00		109	42.8	76	24.5	61	16.1	21	10	120		29.61			29.61	AA		29.57
04	1556	5	M	10.00		108	42.2	74	23.4	57	13.9	19	11	110		29.59			29.59	AA		29.55
04	1656	5	M	10.00		105	40.6	77	25.0	65	18.3	27	11	130		29.58			29.58	AA		29.54
04	1756	5	M	10.00		101	38.3	77	24.8	66	18.9	32	10	140		29.59			29.59	AA		29.55
04	1856	5	M	10.00		95	35.0	76	24.2	67	19.4	40	13	140		29.60			29.61	AA		29.56
04	1956	5	M	10.00		91	32.8	75	23.6	67	19.4	45	11	150		29.62			29.63	AA		29.58
04	2056	5	M	10.00		89	31.7	74	23.0	66	18.9	47	11	150		29.65			29.65	AA		29.61
04	2156	5	M	10.00		88	31.1	74	23.5	68	20.0	52	15	140		29.66			29.67	AA		29.62
04	2256	5	M	10.00		85	29.4	75	23.7	70	21.1	61	7	140		29.66			29.66	AA		29.62
04	2356	5	M	10.00		83	28.3	75	23.7	71	21.7	67	6	130		29.66			29.66	AA		29.62

Figure A-8. Quality-controlled local climatological data hourly observations table for the NAF, El Centro, CA (07/04/2013). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
BLYTHE AIRPORT (23158)
BLYTHE, CA (07/03/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 395 ft. above sea level
Latitude: 33.618
Longitude: -114.714
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0052	12	CLR	10.00		93	33.9	69	20.8	56	13.3	29	7	190		29.28			29.67	AA		29.70
03	0152	12	CLR	10.00		91	32.8	71	21.5	60	15.6	35	8	150		29.27			29.67	AA		29.69
03	0252	12	SCT090	10.00		90	32.2	71	21.6	61	16.1	38	3	200		29.28			29.67	AA		29.70
03	0352	12	CLR	10.00		92	33.3	70	20.9	57	13.9	31	6	170		29.29			29.68	AA		29.71
03	0452	12	CLR	10.00		90	32.2	70	20.8	58	14.4	34	7	190		29.29			29.69	AA		29.71
03	0552	12	FEW110	10.00		92	33.3	70	20.9	57	13.9	31	0	000		29.31			29.70	AA		29.73
03	0652	12	CLR	10.00		96	35.6	70	21.3	56	13.3	26	6	180		29.32			29.71	AA		29.74
03	0752	12	CLR	10.00		97	36.1	72	21.9	58	14.4	27	10	150		29.32			29.72	AA		29.74
03	0852	12	CLR	10.00		102	38.9	69	20.6	49	9.4	17	10	160		29.32			29.72	AA		29.74
03	0952	12	CLR	10.00		103	39.4	72	22.1	55	12.8	20	11	160		29.33			29.72	AA		29.75
03	1052	12	CLR	10.00		105	40.6	71	21.7	52	11.1	17	20	190		29.30			29.69	AA		29.72
03	1152	12	CLR	10.00		105	40.6	72	22.2	54	12.2	18	14	160	20	29.28			29.67	AA		29.70
03	1252	12	CLR	10.00		112	44.4	72	22.4	50	10.0	13	17	160		29.26			29.65	AA		29.68
03	1352	12	CLR	10.00		111	43.9	72	22.0	49	9.4	13	20	160		29.23			29.62	AA		29.65
03	1452	12	CLR	10.00		115	46.1	71	21.5	43	6.1	9	17	200	26	29.20			29.59	AA		29.62
03	1501	12	CLR	10.00		115	46.0	71	21.5	43	6.0	9	18	190	23	29.19			M	SP		29.61
03	1552	12	FEW110	10.00		115	46.1	71	21.7	44	6.7	9	18	210	26	29.17			29.56	AA		29.59
03	1652	12	CLR	10.00		113	45.0	71	21.6	45	7.2	10	18	220	24	29.16			29.56	AA		29.58
03	1752	12	CLR	10.00		112	44.4	71	21.4	45	7.2	11	15	210		29.16			29.55	AA		29.58
03	1852	12	CLR	10.00		109	42.8	70	20.9	45	7.2	12	10	190		29.15			29.55	AA		29.57
03	1952	12	CLR	10.00		103	39.4	70	21.0	50	10.0	17	9	180		29.17			29.57	AA		29.59
03	2052	12	CLR	10.00		98	36.7	70	21.1	54	12.2	23	9	180		29.19			29.58	AA		29.61
03	2152	12	CLR	10.00		99	37.2	72	22.2	58	14.4	26	14	190		29.19			29.58	AA		29.61
03	2252	12	CLR	10.00		96	35.6	71	21.8	58	14.4	28	6	180		29.19			29.59	AA		29.61
03	2352	12	CLR	10.00		93	33.9	70	21.3	58	14.4	31	13	170		29.19			29.58	AA		29.61

Figure A-9. Quality-controlled local climatological data hourly observations table for the Blythe Airport, Blythe, CA (07/03/2013). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
HOURLY OBSERVATIONS TABLE
BLYTHE AIRPORT (23158)
BLYTHE, CA (07/04/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

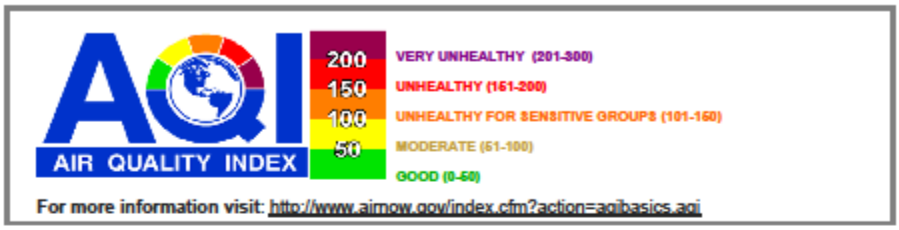
Elevation: 395 ft. above sea level
Latitude: 33.618
Longitude: -114.714
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0052	12	CLR	10.00		92	33.3	69	20.6	56	13.3	30	13	180		29.19			29.58	AA		29.61
04	0152	12	CLR	10.00		92	33.3	69	20.6	56	13.3	30	11	190		29.18			29.57	AA		29.60
04	0252	12	CLR	10.00		89	31.7	69	20.3	57	13.9	34	13	180		29.18			29.58	AA		29.60
04	0352	12	CLR	10.00		87	30.6	68	20.0	57	13.9	36	13	180		29.20			29.59	AA		29.62
04	0452	12	CLR	10.00		87	30.6	69	20.3	58	14.4	37	18	180		29.22			29.61	AA		29.64
04	0552	12	CLR	10.00		89	31.7	71	21.5	61	16.1	39	24	190	32	29.25			29.64	AA		29.67
04	0652	12	CLR	7.00		91	32.8	73	22.7	64	17.8	41	24	190	31	29.28			29.67	AA		29.70
04	0752	12	CLR	9.00		92	33.3	74	23.4	66	18.9	42	22	180	28	29.30			29.69	AA		29.72
04	0852	12	CLR	7.00		96	35.6	75	24.0	66	18.9	37	22	170		29.30			29.70	AA		29.72
04	0952	12	BKN033	6.00	HZ	99	37.2	76	24.5	66	18.9	34	20	170	28	29.29			29.69	AA		29.71
04	1052	12	SCT037	7.00		102	38.9	75	24.0	63	17.2	28	22	160		29.29			29.68	AA		29.71
04	1152	12	FEW037	8.00		104	40.0	75	23.7	61	16.1	24	17	160		29.26			29.66	AA		29.68
04	1252	12	CLR	9.00		106	41.1	75	24.0	61	16.1	23	20	160	25	29.24			29.63	AA		29.66
04	1352	12	CLR	10.00		108	42.2	75	24.0	60	15.6	21	17	160		29.21			29.60	AA		29.63
04	1452	12	CLR	10.00		110	43.3	75	23.6	57	13.9	18	17	170	23	29.18			29.57	AA		29.60
04	1552	12	CLR	10.00		108	42.2	75	23.8	59	15.0	20	18	170	24	29.16			29.55	AA		29.58
04	1652	12	FEW110	10.00		106	41.1	75	24.0	61	16.1	23	18	170		29.14			29.53	AA		29.56
04	1752	12	CLR	10.00		102	38.9	76	24.3	64	17.8	29	18	170		29.15			29.54	AA		29.57
04	1852	12	CLR	9.00		98	36.7	75	23.7	64	17.8	33	18	180		29.16			29.56	AA		29.58
04	1952	12	CLR	10.00		95	35.0	73	23.0	63	17.2	35	17	180		29.19			29.58	AA		29.61
04	2052	12	CLR	10.00		94	34.4	71	21.7	59	15.0	31	21	190		29.21			29.61	AA		29.63
04	2152	12	CLR	10.00		92	33.3	71	21.7	60	15.6	34	11	180		29.22			29.62	AA		29.64
04	2252	12	CLR	10.00		89	31.7	71	21.8	62	16.7	41	9	180		29.24			29.63	AA		29.66
04	2352	12	CLR	10.00		89	31.7	71	21.5	61	16.1	39	15	180		29.24			29.64	AA		29.66

Figure A-10. Quality-controlled local climatological data hourly observations table for the Blythe Airport, Blythe, CA (07/04/2013). Note that haze (HZ) was reported coincident with reduced visibilities and gusty southerly winds. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

Appendix B:
ADEQ and NWS Forecast Products

ADEQ Arizona Department of Environmental Quality



YUMA AIR QUALITY FORECAST FOR
Wednesday, July 03, 2013

This report is updated by 1:00 p.m. Sunday thru Friday and is valid for areas within and bordering the city of Yuma, Arizona

FORECAST DATE **NOTICES** *see below for details AIR POLLUTANT	YESTERDAY Mon 07/01/2013 **NONE** AQI Reading/Category (Preliminary data only)	TODAY Tue 07/02/2013 **DUST**	TOMORROW Wed 07/03/2013 **DUST**	EXTENDED Thu 07/04/2013 **DUST**
O3 (Ozone)	36 GOOD	54 MODERATE	50 GOOD	50 GOOD
PM-10 (Particles 10 microns and smaller)	81 MODERATE	65 MODERATE	65 MODERATE	65 MODERATE

* ***Ozone Health Watch*** means that the highest concentration of OZONE may approach the federal health standard.
PM-10 Health Watch means that the highest concentration of PM-10 may approach the federal health standard.
High Pollution Advisory means that the highest concentration of OZONE or PM-10 may exceed the federal health standard.
DUST means that short periods of high PM-10 concentrations caused by outflow from thunderstorms is possible.

Health Statements	
Tuesday 07/02/2013	Unusually sensitive people should consider reducing prolonged or heavy exertion.
Wednesday 07/03/2013	Unusually sensitive people should consider reducing prolonged or heavy exertion.

ADEQ Arizona Department of Environmental Quality

MARICOPA COUNTY DUST CONTROL FORECAST

ISSUED WEDNESDAY, JULY 03, 2013

Five-day weather outlook:

DURING ACTIVE SUMMER MONSOON EPISODES STRONG OUTFLOW WINDS FROM EVEN DISTANT THUNDERSTORMS CAN GENERATE PERIODS OF DENSE BLOWING DUST

The center of the summer monsoon circulation pattern is forecast to migrate from its current position over Nevada to over New Mexico this weekend. For the Phoenix metro area this means that higher terrain thunderstorms – that will be steered toward the Valley from the north or northeast today – will become steered from the east to southeast in a few days. This will maintain the potential for strong thunderstorm outflow winds and areas of dense blowing dust thru this forecast period. As a result the moderate risk level for unhealthy 24-hour average PM-10 concentrations has been retained for the next five days.

R I S K F A C T O R S

	WINDS		STAGNATION		UNHEALTHY PM-10 RISK LEVEL
Day 1: Thu 07/04/2013	West to northwesterly 10-20 mph with a few higher gusts possible during the afternoon except strong and gusty due to outflow from thunderstorms.	+	Slightly stagnant during the morning hours.	=	MODERATE
Day 2: Fri 07/05/2013	Westerly 10-20 mph with a few higher gusts possible during the afternoon except strong and gusty due to outflow from thunderstorms.	+	Slightly stagnant during the morning hours.	=	MODERATE
Day 3: Sat 07/06/2013	Southwesterly 5-15 mph with a few higher gusts possible during the afternoon except strong and gusty due to outflow from thunderstorms.	+	Slightly stagnant during the morning hours.	=	MODERATE
EXTENDED OUTLOOK					
Day 4: Sun 07/07/2013	Westerly 5-15 mph with a few higher gusts possible during the afternoon except strong and gusty due to outflow from thunderstorms.	+	Slightly stagnant during the morning hours.	=	MODERATE
Day 5: Mon 07/08/2013	Westerly 10-20 mph with a few higher gusts possible during the afternoon except strong and gusty due to outflow from thunderstorms.	+	Slightly stagnant during the morning hours.	=	MODERATE

The Maricopa County Dust Control Action Forecast is issued to assist in the planning of work activities to help reduce dust pollution. A recorded message of this forecast can be accessed at 602-771-2368. To review the complete air quality forecast for the Phoenix metropolitan area, as well as the health impacts and reduction methods for different air pollutants, call 602-771-2367 for recorded forecast information or click on ADEQ's Air Quality Forecast at http://www.azdeq.gov/environ/air/ozone/ensemble.pdf.

CKR 04/28/2011

Appendix C:
Affidavit of Public Notice

ADEQ Arizona Department of Environmental Quality
Janice K. Brewer, Governor
Henry R. Darwin, Director

PUBLIC NOTICE

Request for Public Comments on Exceptional Events in the Yuma Area

In 2005, Congress identified a need to account for events that result in exceedances of the National Ambient Air Quality Standards (NAAQS) that are exceptional in nature (e.g., not expected to reoccur or caused by acts of Nature beyond man-made controls.) In response, EPA promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560). On May 10, 2013, EPA released interim guidance documents to State, tribal and local air agencies for review. These guidance documents clarify key provisions of the 2007 EER in response to questions and issues that have arisen since the rule was promulgated. The EER allows for states and tribes to "flag" air quality monitoring data as an exceptional event. If flagged, these data can be excluded from consideration in air quality planning if EPA concurs with the demonstration submitted by the flagging agency documenting that all procedural and technical requirements have been met.

Pursuant to 40 CFR 50.14(c)(3)(i), the Arizona Department of Environmental Quality (ADEQ) is soliciting comments on draft demonstrations of events that have caused elevated concentrations of PM_{10} in the Yuma area on July 4, and July 10, 2013. ADEQ has decided to flag these episodes based on these analyses. Copies of the demonstrations are available for review beginning Monday, December 16, 2013 on the ADEQ website at http://www.azdeq.gov/environ/air/plan/nee.html. Interested parties can submit written comments throughout the comment period which will end at 5:00 p.m. on Tuesday, January 14, 2014. Any comments received will be responded to and forwarded to EPA with the final demonstrations.

Written comments should be addressed, faxed, or e-mailed to:
Andra Juniel, Air Assessment Section, Arizona Department of Environmental Quality, 1110 W. Washington Street, 3415-A, Phoenix, AZ 85007, PHONE: (602) 771-4417; FAX: (602) 771-2366, E-mail: juniel.andra@azdeq.gov.

In addition to being available on-line, copies of the analyses are available for review at the following locations:

> Monday through Friday, 8:30 a.m. to 4:30 p.m., at the ADEQ Records Management Center, 1110 W. Washington St., Phoenix, AZ, 85007, Attn: Records Center, (602) 771-4380, email: recordscenter@azdeq.gov.
>
> Yuma County Library, Reference Section, 2951 S. 21st Dr., Yuma, Arizona 85364, Attn. Brian Franssen, (928) 782-1871, E-mail: bfranssen@yumalibrary.org.

Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Alicia Pollard at (602) 771-4791 or at pollard.alicia@azdeq.gov. The TDD line for hearing impaired individuals is (602) 771-4829. Requests should be made as early as possible to allow time to arrange for the accommodation.